

OS/2

A G A Z I N E

Under the Hood:
Boot Manager

Information Center:
Hot OS/2 Books for 1995

OS/2 Warp 3.0: The Next Generation

AN IN-DEPTH REVIEW BY THE
EDITORS OF OS/2 MAGAZINE
PAGE 22

Practice Safe REXX

How to avoid subtle coding traps

Reviews

DMMatch 1.09

Editor/2 2.0

PU Monitor Plus

System Performance Monitor/2

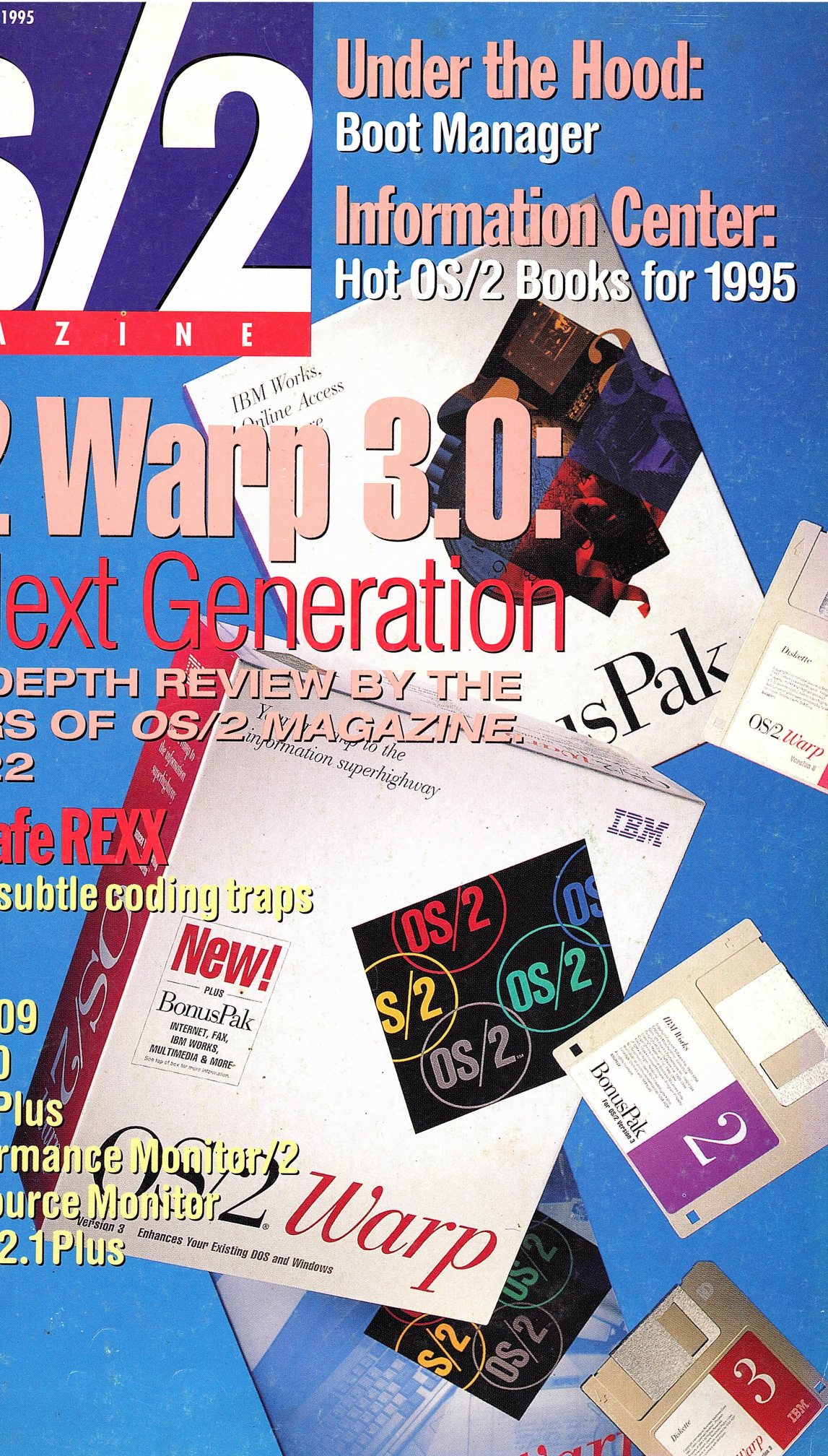
Megas Resource Monitor

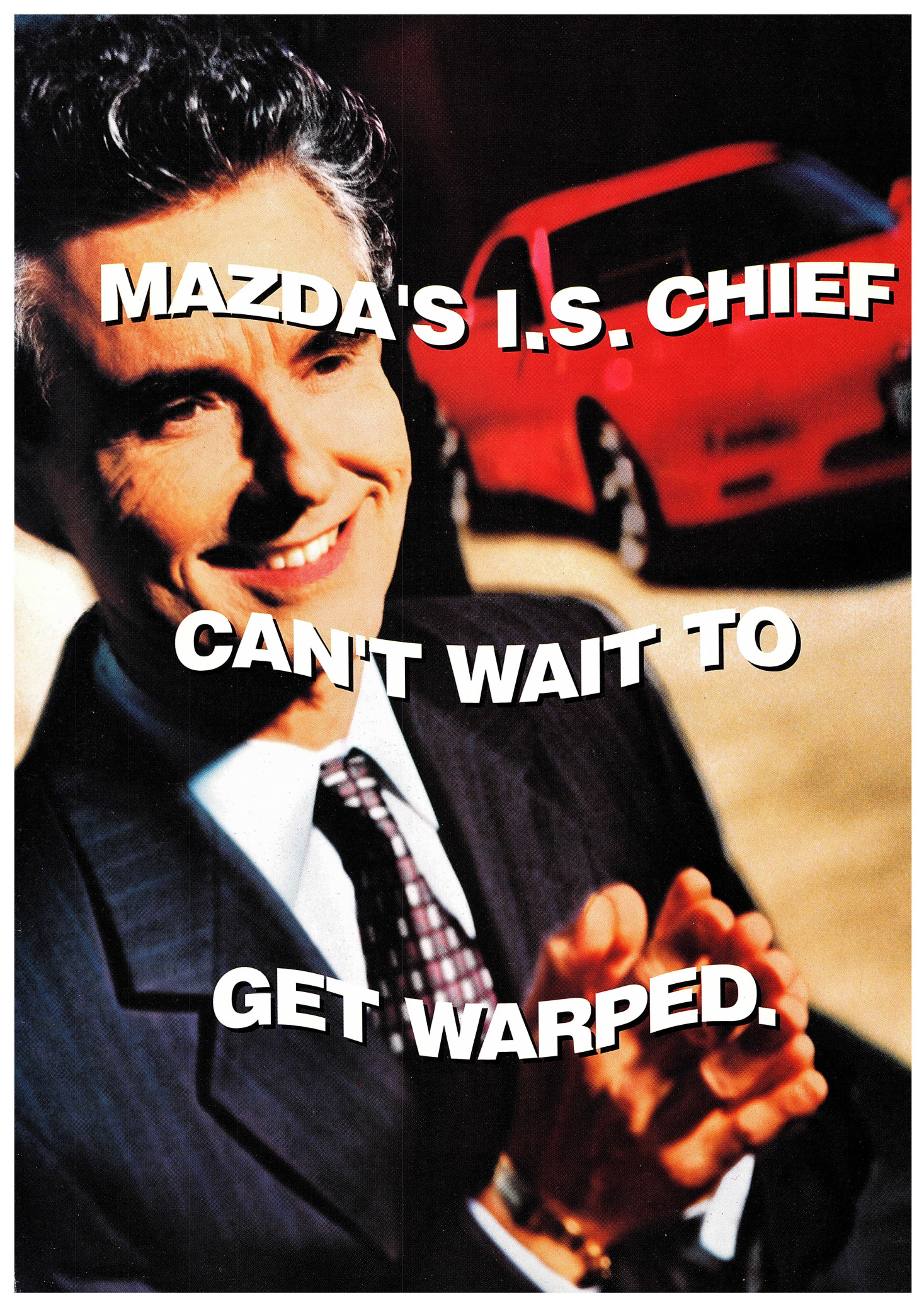
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A man with dark, wavy hair, wearing a dark suit, white shirt, and a patterned tie, is smiling and looking slightly to the right. His hands are clasped together in front of him. In the background, a red sports car is visible, slightly out of focus. The overall lighting is warm and dramatic.

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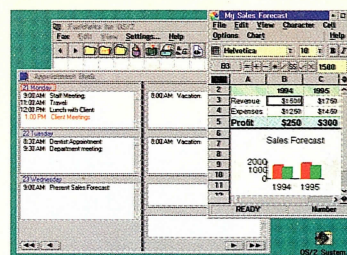
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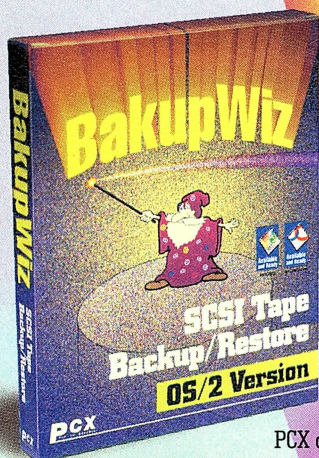
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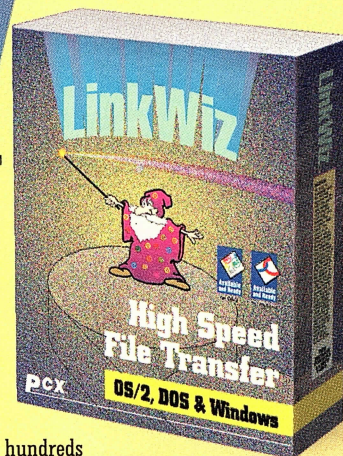
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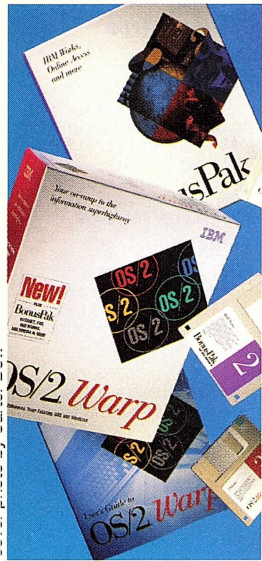
Reader Service No. 2

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MAGAZINE



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Last month, *OS/2 Magazine* offered a quick look at OS/2 Warp 3.0. Now, it's time to go into detail with a special in-depth look at its installation procedure, tutorial, documentation, user-interface tweaks, 4MB performance, BonusPak applets, and the Internet Access Toolkit. Let's throw in some quick projects and shortcuts, while we're at it. The verdict: The best OS/2 yet, and an incredible value for the price. By Alexander Antoniadis, Stan Kelly-Bootle, David Moskowitz, Brian Proffit, David Reich, Esther Schindler, and Alan Zeichick

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OS/2 Magazine editors can be reached on the OS2AVEN forum on CompuServe. If you're not frequenting the various OS/2-related CompuServe forums, you're missing a user forum or *OS/2 Magazine* readers, writers, editors, and the entire OS/2 community to gather electronically. If you're a CompuServe member, you can visit the Forum by typing GO OS2AVEN at the command prompt. You'll be given the opportunity to join the forum. Go ahead—there's no charge beyond normal CompuServe rates.

To leave feedback for *OS/2 Magazine* editors, type GO MAIL and send electronic mail to the addresses listed above. Don't be passive! If you're not a CompuServe member, here's how to join:

■ Set your communications software for 300, 1200, 2400, or 9600 bits per second (bps), 7 data bits, even parity, 1 stop bit, and full duplex.

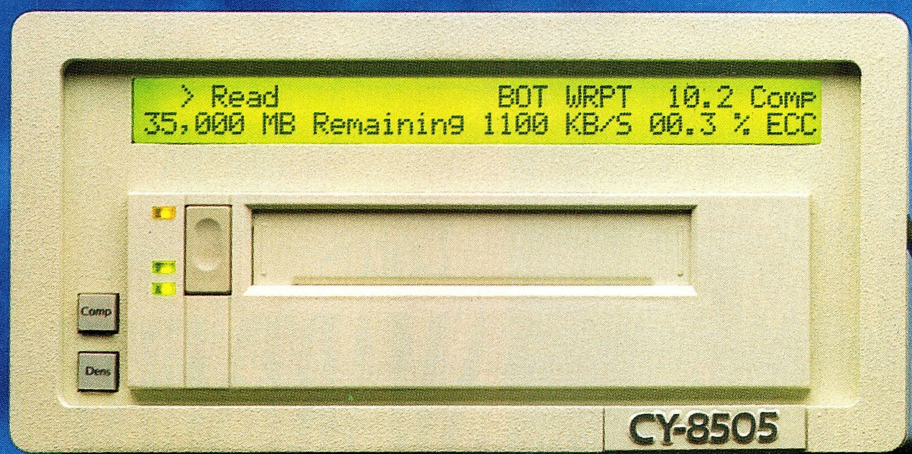
■ To find the number nearest you, dial 800-346-3247 with your modem (in Canada, dial 800-635-6225, voice only). When the modem connects, press Enter. At the Host Name prompt, enter PHONES. Follow the menus and note the number closest to you. Then hang up and dial the number you have just found.

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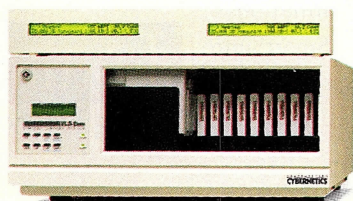
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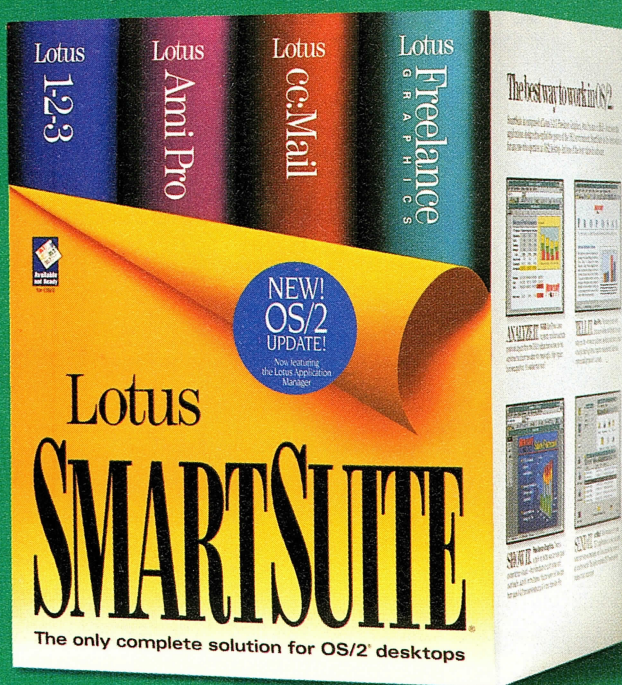
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Perspectives

The Internet Comdex

Back in November, I attended the country's biggest computer trade show, Fall Comdex in Las Vegas, Nevada. Once merely a computer dealer's exhibition, Fall Comdex has become the information-technology equivalent of the Paris fashion runway. Here, manufacturers, retailers, large corporate customers, financial analysts, power users, and journalists decide upon the future of the computer industry.

At 1993's Fall Comdex, the main topic of conversation was OS/2 2.1. OS/2 banners were everywhere, and the show was proclaimed "The OS/2 Comdex" by many who attended. In 1994, OS/2 Warp still had a high profile, but mainly in the IBM booth. This immense space was filled with cheerful IBMers demonstrating OS/2 Warp 3.0, the Internet Access Kit, OS/2 applications, and the latest generation ThinkPad laptops, all to a standing-room-only crowd.

Alas, 1994's event wasn't an "OS/2 Comdex." Once I left IBM's booth, I was continually bombarded by signs proclaiming "We're Building for Windows 95." Yes, friends, Microsoft did their job well, and marketing hype for a not-yet-ready operating system stole the show.

Once you were past Windows 95 and OS/2 Warp, the biggest theme was—no laugh—pornography. Fall Comdex hosted a giant multimedia pavilion: you could tell where the hottest products were, as attendees and off-duty exhibitors alike queued up to see the myriad R- and X-rated CD-ROM publishers. I felt bad for multimedia vendors showing other products, like graphics boards, authoring systems, writable optical discs, or family-oriented fare—their booths ended up as overflow waiting areas for "adult entertainment" distributors and their low-cost show specials.

Sex software at Comdex isn't new, but perhaps this topic is hitting particularly close to home this year. At Comdex, I ran into an old friend, who started a small, somewhat profitable software-development company in Pennsylvania several years ago. It turns out that he and his wife recently sold their company and went into the multimedia porn business. Why? "That's where the money is," he told me proudly. I don't doubt it.

It's a sad statement that this is what multimedia computing has become: Computer professionals and industry leaders attending this wonderfest filled with groundbreaking technologies who can't find anything better to do than gawk at CD-ROM porn. But, since I'm told that sex-related Usenet newsgroups are the most active parts of the Internet, I shouldn't be surprised.

The other major theme I saw at Comdex was computer connectivity. I already mentioned that OS/2 Warp's Internet Access Kit was hot. Internet connectivity was everywhere, and where I wasn't seeing

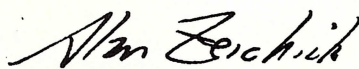
Internet software, I saw crowds checking out 14.4/14.4 PCMCIA modems, V.34 28.8kbps external modems, wireless modems, low-cost Internet service providers, and just about everything else you could imagine. Every book publisher had new Internet books. You may have heard that Microsoft's new on-line service was announced at Fall Comdex; at IBM's booth, a Advantix no-signup-fee offer meant longer-than-expected lines for the three terminals handing registrations. Maybe this show was "The Internet Comdex"?

Connectivity means more than the Internet or other networking, it also relates to human-to-computer communication. Alternatives to the keyboard and mouse are evolving slowly, but steadily. If you've never used Pen for OS/2 on an IBM ThinkPad 755P, trust me—it's addictive. The pen won't replace the mouse or keyboard—but it's a great tool for poking at icons, dragging and dropping, and drawing. Handwriting recognition is slower and less accurate than typing, at least for me, but the convenience of a stylus as a pointing device has to be experienced. (Don't judge pens by your first impression. Remember the first time you used a mouse, and how much you hated it? It takes a while to adapt to a new input device.)

What about voice recognition? Voice Pilot Technologies (Miami, Fla., [305] 670-0807) has developed a set of OS/2-based voice-controlled applets (including a notepad and an appointment calendar). Voice Pilot's individual modules don't offer groundbreaking functionality, but they're the first consumer applications I've seen designed from the ground up for voice command. Voice Pilot's a harbinger of things to come.

Finally, if you use an LCD projector or projection panel with your OS/2 PC or laptop, check out Proxima Corp.'s models (San Diego, Calif., [619] 457-5500). For an extra \$500 or so, you can equip most of their projectors with Cyclops, a video camera that looks at the projection screen and tracks the red dot from a special laser pointer as if it were a mouse. Just click (or double-click) with the pointer's button, and you're in control. Point, click, drag, drop—all using a laser pointer.

Now, isn't that more captivating than a bunch of X-rated movies running under QuickTime or Video for Windows?

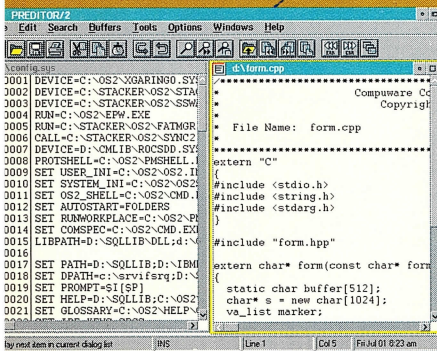


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Letters

Multiple drafts under OpenDoc

Dear Editor:

I have a question about OpenDoc concerning the multiple-draft concept. An issue was raised about a similar feature, known as Fast, Save in Word 6.0. In a nutshell, an early draft of a document may contain information that has been intentionally edited out in later revisions because it is dangerous. It may be insulting to a superior or contain preliminary conclusions with negative ramifications that have since been modified. Whatever the content, it is imperative that these early draft items be absent from the final, submitted copy.

The problem is that these potentially damaging fragments are still present in an earlier draft of the document. Sure, they won't show up when the proper editor is used to examine the document, but if the file is viewed in, say, a low-level disk viewer such as the one in the Norton Utilities, the nasty fragments show up, and can fall into the wrong hands. For this reason I always recommend disabling Fast Save in Word 6.0 and other products that support such "features".

Will OpenDoc handle this contingency? Will it provide safety measures to remove early drafts? A simple proof button would suffice. Push this button and the multiple drafts and revisions are replaced by the final copy. (WYSIWYS—What You See Is What You Save) I believe this is an important issue that should be handled in the OpenDoc system if it is to become an accepted standard.

Dave Stubbs
via the Internet

We forwarded your concerns to two OpenDoc developers and here are their responses:

"This is an issue with typical disk drives as well, as anyone who has seen 'undelete' utilities at work can tell you. The simple answer is that you can

extract a draft into its own file. In this case, no other drafts are carried along, and no 'deleted' information is carried into the extracted file. The file contains the exact contents of that particular draft, and nothing else. One could easily add different, more explicit interface to this, such as a 'trim draft' menu item or Save dialog button.

Of course, this approach would not protect against careless transmission of a file with old information buried within it. It merely allows careful persons to extract clean copies."

Kurt Piersol
OpenDoc Developer

"All OpenDoc Container Suites are expected to support collapsing of drafts. With this feature, old drafts will be removed from the document permanently. In the situation that you mentioned, one can simply remove the old drafts from the final version of the document.

The OpenDoc shell on the Macintosh has a draft window that provides a user-interface for manipulating drafts. Using CollapseDrafts, the shell's draft window can remove the drafts selected by the user while maintaining the most recent draft.

Another way to handle your situation is to copy the top draft into another document. The new document will then contain only the final version. All OpenDoc Container Suites are expected to support copying of a draft to another document. The Mac OpenDoc shell has a menu item called Save A Copy, which takes advantage of this feature of the Container Suites."

Vincent Lo
OpenDoc Developer

A singular exception to "Tips & Tricks"

Dear Editor:

I'd like to point out a small error in the November Tips & Tricks (pp. 67-70). Under the section entitled "Shutdown Settings," you mentioned setting **RESTARTOBJECTS** to **STARTUPFOLDERONLY** to prevent automatic startup of programs active before shut-

down. However the parameter is **STARTUPFOLDERONLY** (plural). I know this from hard experience, because I once tried it with the singular spelling and got no complaint from OS/2's processing of *config.sys*, but I didn't get the desired results.

Richard Corzo
via CompuServe

Data Templates

Dear Editor:

Every time I try to set up the data-file templates after setting the proper file associations (*.doc for WordPerfect), a dialog box interrupts me whenever I try to rename the new file object (wpdoc.doc for WordPerfect). Answering Yes or No gives me a data file that always opens *e.exe* when I tear one of the templates off and put it into my Client folder.

Frank W. Bussey

What's happening is that OS/2 is asking whether you really want to change the extension of the file. If you do, it will (in most cases) change the association of the file.

The reason that OS/2 is opening e.exe is probably because that extension is associated with E and the oldest association takes precedence. You'll probably notice that when you click the right mouse button on the object and press the Open arrow, a list of programs associated with the object will appear. We want to put WordPerfect at the top of the queue.

You need to find your e.exe object and remove the association. If you have no other program objects associated with .doc, WordPerfect will be at the top. (You'll notice that the icon will change to the WordPerfect program icon).

Now, if you want e.exe to be available as an editor for other .doc files, just add the association back to the e.exe object. When you want to open a .doc file with e.exe, click the right mouse button and press the Open arrow. Select System Editor and the file will open under that program.

Brian Johnson

OS/2 Vendor Council

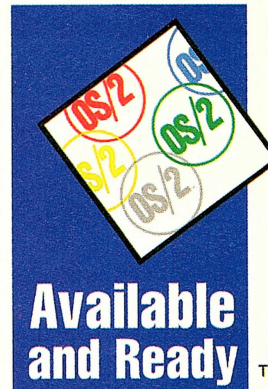
"Growing the market for OS/2 and related products."



OnCmd xBase for OS/2 by On-Line Data

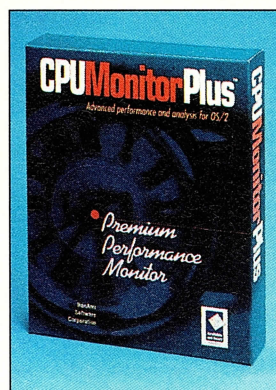
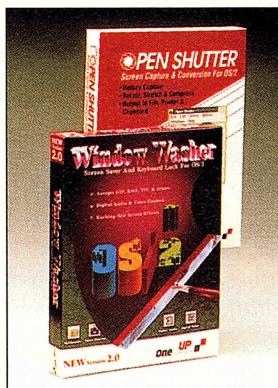
OnCmd harnesses the power and the speed of OS/2, enabling you to create native 32 bit GUI applications in the familiar xBase language. OnCmd's user-friendly development environment comes with screen painter, report generator and is client/server ready. Unlimited runtime licensing available.

*These products are certified
for use with OS/2*



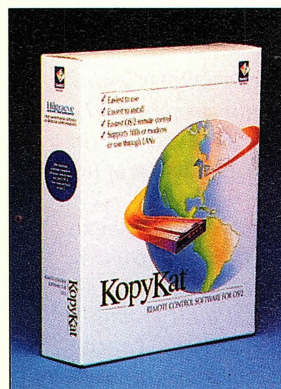
Window Washer and Open Shutter by One Up

Window Washer is a screen saver for OS/2 which provides password protection and Full Screen keyboard monitoring. Version 2.0 features many exciting effects, digital audio and video. Open Shutter is a screen capture utility that allows users to capture desktop images, modify, then output to a printer, clipboard or a variety of file formats.



CPU Monitor Plus by BonAmi

CPU Monitor Plus is your professional Performance Monitor and Analysis package. Display realtime CPU, RAM, Disk, Interrupt and COM port activity. Diagnose poorly running systems. Start, stop and suspend programs. Set execution priorities. Over 100 different metrics, ratios and more.

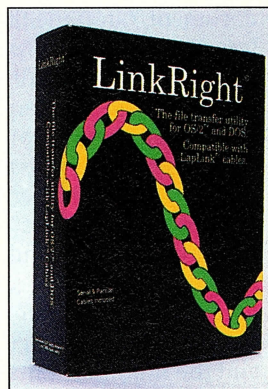


KopyKat by Hilgraeve

KopyKat is a graphical OS/2 remote control solution. You can display the entire desktop of a remote OS/2 system in a window on your OS/2 system. Do anything remotely, that you can do locally. KopyKat supports 200+ modems by name and any Netbios compatible network.

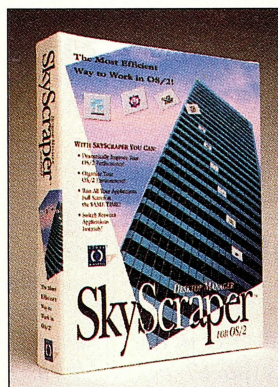
LinkRight by Rightware

LinkRight is a parallel port and serial port file transfer utility made especially for OS/2. The package includes a PM version, an OS/2 command line version, and a DOS version. Maintain EA's and long file names. Supports HPFS and FAT files. CRC checking to insure accurate transfers. Compatible with LapLink cables.



SkyScraper™, Desktop manager for OS/2 by Binar

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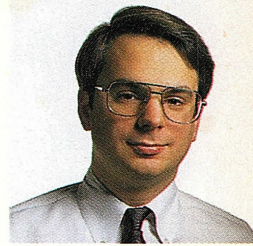
Performance PLUS V3 by Clear & Simple

A Tuning and Utilities Kit for OS/2. Simplified graphic interface brings power tuning to all users. Now tunes DOS/Win apps with clear settings descriptions. New utilities simplify bitmap viewing, and automate file & Desktop backup. New GUI swap monitor; boot disk or partition; and more. Make your OS/2 system run snappy!

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A warped perspective on Comdex

OS/2 WARP TRYING TO GET OUT OF THE SHADOW OF ITS VAPOROUS RIVAL BY ALEXANDER ANTONIADES



Fall Comdex 1994 had a great impact on OS/2 community before it even started. All summer, IBM insiders would often refer to the release date of OS/2 Warp 3.0 as "before Comdex." The goal of this was to show up the then-to-be released operating system from Microsoft code-named "Chicago." But Chicago turned into Windows 95, with anticipation of shipping in that year, and IBM was stuck releasing their premiere operating system months before their programmers were comfortable with it.

All was not lost, however, because Comdex is not the worst place for a computer company to overspend and that's just what IBM did. There were IBM and OS/2 banners and video kiosks all over the main convention center. The main IBM booth contained more than 190 exhibits, most of which belonged to IBM, and the largest demo area featured comedienne Paula Poundstone. The IBM media people bought lots of Comdex and local advertising including sponsoring the press room, where every machine had OS/2 Warp installed, and even buying ad space on the hotel keys of local casinos.

Outside of what IBM sponsored, however, Warpmania was not as obvious. More prevalent were the "We're Building for Windows 95" signs in many of the booths, but sometimes there wasn't a great deal of excitement about Windows 95. The reason for this, as one vendor told me, was that because Windows 95 wasn't shipping, no selling opportunities existed.

More than 150 members of Team OS/2 were out in force, offering to

install OS/2 Warp on any machine anywhere. But Microsoft was not far behind, offering free T-shirts and mice as incentives to install the latest Windows 95 betas.

Also at Comdex, making its first public appearance, was the OS/2 Workplace Shell running on the PowerPC. While there were at least 20 PowerPCs running an alpha version of OS/2, none of the displays were particularly impressive. There was no hint of any speed increase over the Intel version of OS/2, and the PowerPC boxes that were running this unoptimized, incomplete version of the Workplace Shell had at least 96 MB RAM.

At Comdex, OS/2 was not the clear winner that IBM hoped it would be. While it is true that this year's event was probably one of the better Comdexes in terms of OS/2 support and awareness, OS/2 has failed to make a serious presence outside of the IBM booth.

Although it can't be said that OS/2 is doing well, its momentum is increasing. For example, at last year's Comdex, when I approached most booths, vendors would often ask what OS/2 and if most machines were capable of running it. This year, more vendors showed an interest in OS/2, and Windows vendors were proudly proclaiming that their products would run under Win-OS/2. Colorado Memory Systems told us that they receive an average of 200 phone calls a day asking for OS/2 support for their tape backup products.

One fact that should help more Windows companies move into the OS/2 marketplace is that they are now writing 32-bit programs for Windows

95. The process of translating applications from 32-bit Windows to OS/2 is much easier than it was from 16-bit Windows. One example is the HyperAccess Lite applet from Hilgraeve, which is included in the OS/2 Warp Bonus Pak. HyperAccess Lite is also planned to be included with Windows 95 and, according to Matt Gray, the president of Hilgraeve, porting it to OS/2 took about 1/5 of the time that was spent writing the application originally for Windows 95. Certain large software vendors, notably Lotus and Corel, have said that they would port the current versions of their applications to OS/2 once their Windows code was 32 bits.

The catch is that most of these vendors would rather miss a month in the OS/2 market than miss a day in the Windows market. As a result, their OS/2 development is staggered behind their Windows 95 efforts. This will undoubtedly hurt OS/2 Warp, especially if Windows 95 slips from the first half of 1995.

IBM must convince the vendors who are "Building for Windows 95" that OS/2 Warp is ready for them today. If their applications are close to being finished, and they want to see some early profits, a quick port to OS/2 could be the answer.

As it happened, the main OS/2 news that came out of this year's Comdex was in the announcements made by some of the object technology companies that IBM has invested in. Next month, we'll look at those announcements and the impact they will have on the future of OS/2.

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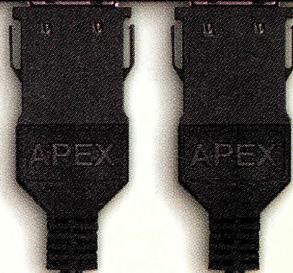
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Significant Impact

HOW WILL OS/2 WARP 3.0 AFFECT
THE OPERATING SYSTEMS MARKET? BY AMY D. WOHL



With the new version of OS/2, IBM seems to be shifting and broadening its OS/2 focus in several ways. Changes in the features and positioning of a revitalized OS/2 might have a significant impact on the entire operating system market.

For most of OS/2's history, its success has been focused within the corporate market where its robustness and technical strengths, such as multitasking, multithreading, and an enhanced graphical user interface with fully-implemented drag-and-drop, have found favor. These features are important in the corporate market. Large companies carefully analyze the cost of support, recognizing the savings that trouble-free platforms and better user interfaces can give through greater availability, lower support requirements, and higher user productivity. Smaller companies and individual users need robust and easily-supported systems, just as larger companies do, but they are less likely to recognize the underlying causes of their dissatisfaction and are generally slower to make changes to their technical environment—they are financial conservatives.

Large companies frequently assess operating systems, as much as they assess platforms for the development of in-house applications, as environments in which to run commercially-available applications software. In fact, for many large users, not much commercial software is required beyond a few personal-productivity tools. It is in this category that the robust features of OS/2 have been particularly appreciated.

But IBM wants to appeal to a broader audience, so OS/2 Warp is designed

**Smaller
companies are less
likely to recognize the
underlying causes of
their dissatisfaction.**

to continue to appeal to its established corporate audience with enhanced features and to move beyond that audience, appealing to individual users and small businesses. Toward that end, IBM has not only slimmed down OS/2 and made it work better, but it has executed a number of packaging and marketing strategies that are designed to make the total value difficult to resist. Different markets will see different faces of this strategy, but two features will achieve particular prominence.

The Internet on-ramp

With all of the interest (and the hype) about the information highway, IBM will be the first major vendor to deliver a bundled on-ramp that signs you directly onto the Internet (with or without IBM as a service provider) in less than one minute. IBM is also taking advantage of the multithreading capabilities of OS/2 to provide superior features and performance within the Internet connection. Multiple Internet connections and activities can occur simultaneously on a single-modem connection. In addition, IBM is providing a very appealing graphical user

interface to the Internet and is soon to offer a WebExplorer.

Response to IBM's classy Internet connection has been predictable. Both Novell and Microsoft are assuring customers that they, too, will offer Internet on-ramps of their own—Novell's is bundled with the Corsair interface (expected in 1995) and Microsoft's is part of the Windows 95 offering (but apparently not part of the first release).

IBM has managed to raise the bar on what constitutes connectivity within an operating system at the desktop (or client) level. They've gained some marketing space for this new version of OS/2, as customers who find these features appealing will not find them integrated into competitive products before mid or late 1995—at the earliest. (Separate products and Internet services are, of course, available today, but they require more customer effort to identify, acquire, install, and integrate.)

The software bundle

IBM is bundling a substantial amount of software with the new OS/2 Warp. Their intention is to make OS/2 useful right out of the box. The customer doesn't need to acquire additional software immediately (or confront the fact that OS/2 software applications can sometimes be scarce or hard to find). The pieces of the bundle clearly position OS/2 as a small business or home office user (SOHO) product. These applets aren't the standard mainstream corporate products, but work-a-day alternatives that can help people get started and are possibly all some customers will need.

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Targeting this segment of the market is IBM's gamble. From a technical point of view, OS/2 offers an easy-to-use interface and a robust trouble-free platform. From a support-and-reliability point of view, IBM will be viewed as an excellent supplier. But from a software point of view, the customer will have to be either a novice who's buying the IBM brand instead of software products, such as Microsoft Word, Excel, or WordPerfect (none of which are currently available on OS/2), or the customer will need to be willing to run those products on OS/2 in their Windows versions—a tougher sell for an unsophisticated user.

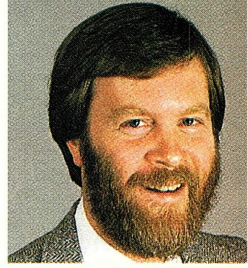
Don't expect Microsoft to start bundling software with Windows to compete—they don't have to. On the other hand, a lot of bundling is likely to occur on the system level. But you should look for systems that will be appearing in the stores and catalogs that are aimed at the individual buyer and SOHO market that include hardware, operating system, and a start-up pack of software. Works products from mainstream vendors, not unlike some of the OS/2 bundle, are often a part of these offerings already, and these efforts are likely to escalate. I'd guess that some vendors may start bundling suites to the SOHO market—especially at the prices a volume buyer will pay. IBM would be in the position where it could only retaliate by making a deal with Lotus, who makes the only OS/2 suite in town.

IBM is going to end 1995 with a much larger number of copies of OS/2 in the marketplace—and a higher percentage installed on desktops, instead of servers. But in this fast-growing market, I suspect that the market-share gain, unless Windows 95 doesn't hit its mid-year-to-market goal, will not exceed a few percentage points. But then, we'd love to see customers prove us wrong by finally catching on to why OS/2 is a great operating system.

Amy D. Wohl is president of Wohl Associates, a consulting firm specializing in office information systems, personal computing, and end-user computing. She is also editor of the Trendsletter, a monthly newsletter on computer industry trends.

Bait and Switch?

MICROSOFT NEEDS TO COMBINE THE BEST OF WINDOWS NT 3.5 AND WINDOWS '95 BY WILLIAM F. ZACHMANN



Microsoft's dilemma is likely to cause them to try a "bait and switch" strategy to maintain customers. Well, okay, maybe I shouldn't call it a dilemma. After all, my old (circa 1973) Webster's New Collegiate Dictionary defines dilemma as "a choice or a situation involving choice between equally unsatisfactory alternatives" and "a problem seemingly incapable of a satisfactory solution." That may be a bit too strong. It's more like a choice between two not-entirely-satisfactory alternatives and a problem for which no obviously satisfactory solution exists. Still, it's a problem for Microsoft, to be sure.

The two not-entirely-satisfactory alternatives to which I refer are, of course, Windows NT 3.5 and Windows 95 (a.k.a. Chicago). What Microsoft really needs, in the face of stronger competition from OS/2 Warp, is something that combines the best aspects of both. What Microsoft (and therefore Microsoft's customer) really has, however, is an uneasy choice between the two. Either way, something desirable must be compromised in the process.

That wasn't the way it was supposed to be when Chicago hype was at its peak in the fall of 1993 and everyone thought Chicago would ship in time for Comdex in Fall 1994. The gushing-ly adoring descriptions of Chicago in the trade press back then made it seem that it would deliver NT's robust stable multithreaded multitasking foundation and support for full-function 32-bit Win32 applications. All of these features were to be achieved with resource requirements no greater than those of Windows 3.x and with backward compatibility for 16-bit DOS and Windows applications, which were as good or better than Windows 3.x's. In addition, of course, Chicago was supposed to deliver all sorts of nifty new "bells and whistles" (like Plug'n'Play).

If Windows 95 had, in fact, lived up to the promises that were made for Chicago, there hardly would have been any need to bother with Windows NT at all, except as a very high-end specialty operating system for Unix workstation-like niches and as a server OS. If Windows 95 delivers what was promised for Chicago, in theory, hardly any need for Windows NT Workstation would exist at all. For a while, until Microsoft finally admitted that Chicago wasn't going to ship in 1994 after all and people began to see what Windows 95 really was, fans of Windows NT were almost as gloomy as fans of OS/2 were back in 1991 or 1992.

Fans of NT cheered up considerably, however, when information about the reality of Windows 95 (versus the original promises made or implied for Chicago) became more readily available late in the summer and through the fall of 1994. As more details of Chicago or Windows 95's architecture were published and beta versions were more widely circulated, it became more obvious that although Windows 95 might provide, in many respects, an attractive upgrade for Windows 3.x, it would surely fall far short of delivering anything like NT's robust foundation.

As impressive as Windows 95 may be, it certainly is no "NT Lite." The architectural compromises that were made to ensure backward compatibility for 16-bit DOS and Windows applications and its attempt to try to squeeze its footprint into the 4MB Cinderella's slipper of Windows 3.x have seen to that. In addition, it isn't only a matter of "needing a little more work." It is now clear, beyond any reasonable doubt, that Windows 95 will never provide the robust multitasking and support for multithreaded Win32 applications that Windows NT does.

It seems that Windows 95, in reali-

ty, is exactly the same as Chicago was one-and-a-half years ago—a cleverly, perhaps even brilliantly, hacked up version of Windows 3.x, instead of a slimmed-down version of Windows NT. Its support for Win32 applications is more accurately characterized as "Win32s on steroids" than "NT Lite." It is an operating system "of pleasing exterior, but of dubious inner content," to borrow a phrase from G.I. Gurdjieff.

It appears likely, however, that Microsoft really believed, for a time, their own hype about Chicago. They do seem to have thought, until approximately the middle of 1994, that they would not only be able to finish the darn thing by the end of the year, but that they would be able to get it to run full-function Win32 applications reliably. Although the evidence is incomplete and based, in part, on indirect sources, it looks as if Microsoft went through a major reevaluation of the product during the summer of 1994. The announcement of both the delay to "first half of 1995" and of the "Windows 95" name were accompanied by a strategy shift and repositioning of Windows 95 and NT.

Prior to August and September 1994, Microsoft appeared to be on a course to make Chicago it's flagship desktop operating system, virtually to the exclusion of NT. NT was clearly de-emphasized as a general desktop and laptop OS and was primarily focused as a server OS with the secondary position of competitor to Unix on very high-end workstations. Even basic stuff, such as PCMCIA and Adobe Type Manager support for NT Workstation (to say nothing of fax support) got little attention or resources. All the "good stuff" was being concentrated on Chicago, including a new user interface, Plug'n'Play, integrated e-mail, and so on. After all, if Chicago was going to be so great, who would need NT?

By August 1994, however, it became obvious to even the most fanatical

Chicago zealots within Microsoft that, no matter what they did, Chicago wasn't going to be all that great when it really got down to running full-function Win32 applications. No matter what they did and no matter how hard (or how brilliantly) they tweaked it, Chicago rested on the inadequate architectural foundations of Windows 3.x and could never do adequately what could be done on the much-more-solid architectural foundations of Windows NT.

Once that became clear and Microsoft let go of any illusions about Chicago as an outright desktop replacement for NT, the necessity for a strategy adjustment became obvious. Chicago (renamed Windows 95) had to be delivered as quickly as possible as a simple upgrade to Windows 3.x, while the "advanced features" of Chicago (what I earlier referred to as its "bells and whistles" or "the good stuff") had to be brought over onto Windows NT as quickly as possible.

The clearest indication that Microsoft had, in effect, given up on Windows 95 as a robust platform for multitasking and

full-function multithreaded applications was the news (that was quietly let out only as they were ready to ship later in the fall) that Microsoft's own first Win32 versions of their flagship applications, such as Word and Excel, were fundamentally single-threaded. That fact, more than anything else, showed that Microsoft had no confidence in the robustness of Windows 95's support for multithreaded applications.

Fans of "Windows Everywhere" once liked to talk about how OS/2 would be crushed between Chicago and NT. What we got, instead, was the potential for a sort of "Goldilocks Phenomenon," whereby OS/2 could turn out to be "just right" between NT's "too big" and Chicago's "too flaky at the foundations."

Microsoft's best shot, therefore, is what amounts to a sort of "bait and switch" strategy, whereby Windows 95 promises, in addition to its glittering bells and whistles, what can only be delivered properly by NT in terms of a sufficiently robust foundation—not only for industrial-strength use in business, but for glitzy multimedia and

information superhighway applications in the consumer market. Of course, before that can happen, Microsoft has to get all those bells and whistles over onto the NT foundation without letting NT get even fatter and more resource-hungry in the process. Memory and system prices have got to come down a lot more to make NT-capable systems more affordable.

The real challenge for Microsoft, however, will be to keep users sufficiently dazzled with the glitter and promises for Windows 95 to prevent them from getting off the Windows Everywhere bus entirely and wandering off to get Warped. That isn't going to be nearly as easy as the majority assumes it to be. Of that I am more sure than ever.

Will Zachmann, a well-known computer-industry analyst, is the founder and president of Canopus Research, based in Duxbury, Mass. He is also a former vice-president for corporate research of International Data Corp. You can reach him on CompuServe at 76004,3657, or on his popular CANOPUS forum.

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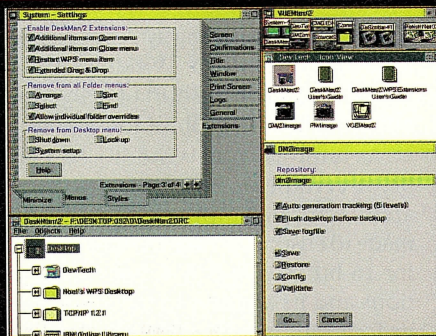
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- Control, selectively or globally, all WPS defined object styles, menu items and capabilities - the ability to Arrange, Sort, Delete, Rename, Settings, Lockup, Shutdown, etc. (even object visibility!) is completely definable
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Uninstalling Editors Quickly

PMDMATCH 1.09H, PREDITOR/2 2.0, AND QUICKEN 4 BY BRIAN PROFFIT



PMDMatch 1.09h

In his October 1994 "Perspectives" column (p.7), Alan Zeichick called on software vendors to stop scattering information all over our disks without giving us an easy way to uninstall it. The flood of responses that his column generated made it clear that many readers agreed with him. Sadly, though, experience has proven that even an overwhelming response from customers might not be enough to cause vendors to change their practices. Well, if we can't convince the vendors to do the right thing, at least we can acquire tools to help us rectify the problem. PMDMatch is just such a tool.

The shareware PM Directory Matching utility is, at its essence, a way of comparing two disk directories—an effective way to compare a backup to your current disk contents and copy only the files that have changed. The screen shows how PMDMatch highlights the changed files for you. You don't have to display all files, because PMDMatch allows you to filter out files based on their attributes or use expressions against their filenames. You can also choose to display only the files that are alike or only those that differ.

If you want to look into one of the files, just double-click on it. PMDMatch automatically invokes the System Editor and loads the selected file. You can customize it to use a different editor, if you prefer. If you have a file-comparison program, PMDMatch can call it directly to go into detail about the differences between the files. The author was also thoughtful enough to include drag-and-drop support for the color and font palettes.

A number of file-manipulation

D:\G3\A			A:\		
File Name	File Size	Date	File Name	File Size	Date
OS2AVEND.BAK	44,834	07-13-94	OS2AVEND.BAK	44,834	07-13-94
OS2AVEND.CAT	278,169	08-09-94	OS2AVEND.CAT	278,169	08-09-94
OS2AVEND.MSG	114,031	10-28-94	OS2AVEND.MSG	113,659	10-28-94
OS2AVEND.OLD	101,443	10-26-94	OS2AVEND.OLD	101,443	10-26-94
OS2AVEND.SAV	82,631	10-26-94	OS2AVEND.SAV	82,631	10-26-94
OS2AVEND.SEC	633	10-26-94	OS2AVEND.SEC	633	10-26-94
OS2AVEND.TMK	45,291	10-26-94	OS2AVEND.TMK	45,291	10-26-94
OS2BVEND.CAT	283,345	10-17-94	OS2BVEND.CAT	283,345	10-17-94
OS2BVEND.MSG	92,903	10-28-94	OS2BVEND.MSG	92,530	10-28-94
OS2BVEND.OLD	86,209	10-27-94	OS2BVEND.OLD	86,209	10-27-94
OS2BVEND.SAV	35,780	10-27-94	OS2BVEND.SAV	35,780	10-27-94
OS2BVEND.SEC	399	10-26-94	OS2BVEND.SEC	399	10-26-94
OS2BVEND.TMK	44,879	10-26-94	OS2BVEND.TMK	44,879	10-26-94

pushbuttons at the bottom of the display window make PMDMatch useful as a general file utility. In addition, a nice pop-up menu can be accessed by pressing mouse-button two over any file, which adds to its usability for file manipulation. Manipulating files, however, isn't its main function, so don't expect those abilities to be as complete as you might find in a utility written specifically for that purpose.

A tool to uninstall software

Full directory comparison doesn't work as well when you're trying to see what has changed across an entire disk or partition. Chances are good that the backup didn't all fit on a single disk to be compared. For this purpose, PMDMatch includes a snapshot utility.

When installing a new program, you should always make sure your backup is updated first. After you have done a complete backup, load your directory into PMDMatch, making sure to select the check box to include subdirectories. Then, save a snapshot of that information. PMDMatch writes a file to disk that is, effectively, a directory listing with file dates and sizes included. You can even add comments to that file, if you like, as long as you begin those lines with an asterisk so PMDMatch knows they're comments when it reads the file later. Commenting the file and printing

it can make a nice record for your archives.

After installing the new software, reload PMDMatch and bring the new directory structure up. Load the snapshot that you saved before installation. PMDMatch will automatically highlight every file that was modified by the program's installation routine (which is a great time to take advantage of

PMDMatch's option to show only the files that have changed). Now you know precisely which files to reload from your backup when your evaluation concludes that this program deserves the old heave-ho.

Glee or flee

PMDMatch is a very handy utility for tracking changes to your disk. I hope some of the vendors of backup software will consider using it, or something like it, as an intelligent front-end. It is shareware, so it doesn't cost you anything to give it a try. But, as always, if you decide to keep it, please take the time to register it.

Predictor/2 2.0

... 'tis true that we are in great danger; The greater therefore should our courage be.
—W. Shakespeare, Henry VI

I repeatedly vow that I will never again enter into a discussion of programmer's editors. Developers seize onto their favorite editors with a religious fervor that rivals the debates between pro and anti-Limbaugh forces. Before writing such a story, reviewers must accept the fact that the majority of the audience will think them insane for not seeing that their favorite editor is demonstrably superior to the product

being reviewed. It is with a heavily tarnished, but proudly intact shield that I again enter that battle.

Preditor/2 is the 32-bit graphical result of Compuware Corp. having purchased the rights to the Sage Professional Editor (SPE) from Intersolv. (Yes, the name is a derivation of Professional Editor. You didn't think it swooped down and ate your data, did you?) For a variety of reasons, developers have traditionally shunned graphical editors for more traditional character-based products, such as Brief. Despite its excellence, the OS/2 Enhanced Editor (EPM) hasn't quite become the programmer's editor of choice, largely due to its graphical nature (and IBM's bizarre decision to keep the macro language interface a secret for so long). The time has come for developers to try to wipe away their preconceptions and reconsider the viability of a graphical editor.

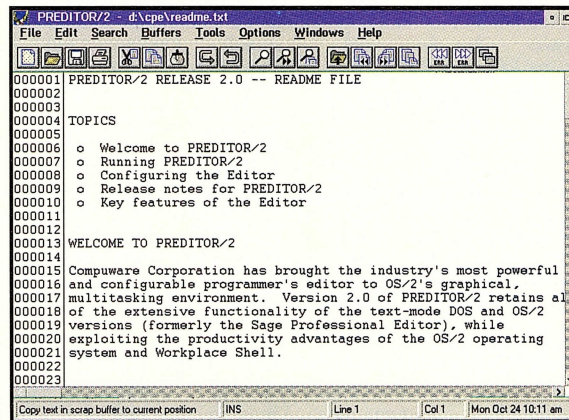
All the standard programmer's editor features

If a product is going to claim to be "the editor for untamed programmers," it had better include certain features. It must understand the syntax of several programming languages. Although this feature is turned off by default, Preditor/2 contains templates that it can use for the expansion of key constructs used in AWK, C/C++, Clipper 5.0, Clipper '85, COBOL, dBASE, FORCE, Pascal, and REXX. Now that PL/I for OS/2 is available, perhaps they'll consider adding it. Syntax highlighting isn't offered yet, but is promised for the next release.

Delimiter matching is an important debugging tool that is used to help you find out why you have one too many curly braces opening code blocks. Preditor/2 does this well with brackets and parentheses, but can't handle begin/end blocks. To help you really understand larger programs, you need to be able to see different views of the same file open in different windows. Being a graphical editor, Preditor/2 should be able to handle this more easily and flexibly than character-based products. They've chosen to use an MDI interface to accomplish this feat. MDI is

effectively dead in the OS/2 world, but it works well for this purpose. It helps work on several files at the same time but, unfortunately, I still had a lot of trouble getting multiple views of the same file.

For character-based editors, it was a significant improvement to be able to launch my compiler from within the editor. This feature is less important with a graphical editor, but Preditor/2 is preset with names and switches for a num-



ber of different compilers. More importantly in the OS/2 world, Preditor/2 integrates with WorkFrame/2, IBM's integrated development environment. I had no problems identifying Preditor/2 as my editor within WorkFrame/2, and the editor window reactivated with highlighted error lines after a failed compilation run (using somebody else's buggy code, of course).

Other Preditor/2 features that have become standard for programmer's editors include tags and named bookmarks. It offers unlimited undo/redo support, and the maximum number of files/windows that can be opened is limited only by your system. Command and filename completion is included to help with the long names that you can't remember or don't want to spend time typing. Search-and-replace support is quite extensive, including the ability to use regular expressions and search across multiple files.

One of the biggest inhibitors to anybody who is thinking of changing editors is the learning curve. We spend so much time getting accustomed to a specific set of actions and keystrokes that it is a real chore to change. Most editors recognize this fact and include keyboard

maps that allow them to behave like other editors. Preditor/2 includes keymaps to emulate Brief, CUA, vi, Emacs, and ISPF. Unfortunately, Compuware didn't take the extra step of providing support for macros from other editors. A provision for either running Brief macros or converting them to Preditor/2's Professional Extension Language (PEL) would allow many more people to consider converting.

Less-expected goodies

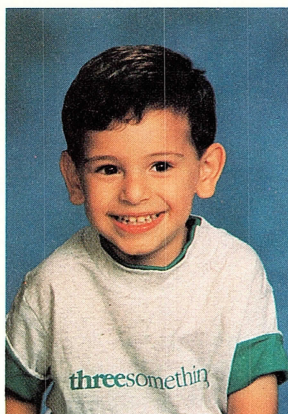
Preditor/2's heritage as the Sage Professional Editor shows in its links to Intersolv's PVCS version-control system. **Get** and **put** commands are contained within the editor, as is the Vdiff file-comparison tool. Another indication of its background is the ability to load the editor by typing **c** at the command prompt. Why is a product named Preditor/2 loaded with a "c"? Because, when Compuware bought the product, they wanted to change as little as possible, so SPE became CPE. C is a stub

loader that either loads the entire editor or loads a new file into an already existing instance of the editor. Of course, you can also use drag-and-drop, either onto the icon or into an already-running editor window.

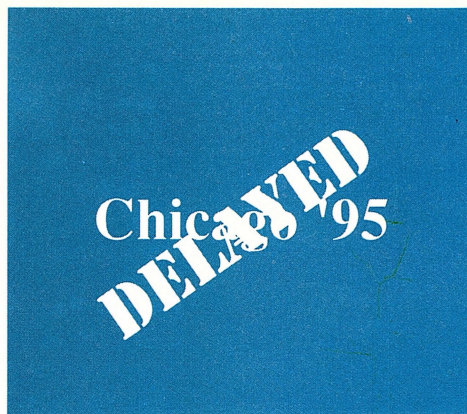
Preditor/2 is highly configurable, by modifying configuration files as you would with most editors, or through a detailed Settings notebook. The Settings notebook technique is, however, a bit confusing—the tabs at the bottom for subtopics are not always complete. I know they're restricted by the behavior of the notebook control, but I think they could have come up with a clearer way to move to subtopics that don't have visible tabs. For the ultimate in customization, Compuware says they will even make most of the source code available.

Of course, the real key to editor customization is development of your own macros. PEL is an extremely rich language, complete with its own debugger. It is based heavily on AWK, so UNIX enthusiasts should love it. The significance of PEL can be measured by the fact that approximately 75 percent of the Preditor/2 documentation is about PEL. A compile step for PEL

Three-O.



Uh-Oh!

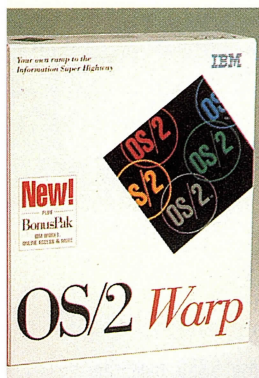


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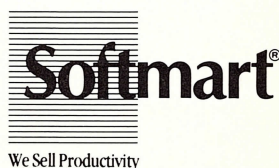
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macros is included, but unlike AWK, which produces executables, the PEL compiler really does more of a tokenization into p-code that is interpreted at runtime. A command dialog window is included to allow entry of single PEL instructions interactively.

By the way, Compuware was also considerate enough to include an uninstall facility. No vendor wants to admit that you'll ever want to remove their product, but I applaud all vendors who are willing to put consideration for the user's desires first.

Some annoyances to note

Even more than usual, the README file is required reading for this product. A number of bugs and workarounds are described. I appreciate their honesty in helping the user work around the problems but, as always, I wish they'd gotten it right in the first place, so it wouldn't have been necessary.

Initial program loading is quite slow, largely due to pulling in the AWK runtime. If you're a serious developer (and if you're not, you have no need to be looking at this product anyway), I would advise you to add Predictor/2 to your startup folder. That way, when you invoke it later, you simply open a new buffer in the existing instance of the program instead of going through the long load time.

I find it very frustrating when a vendor throws in a lot of hints of things to come but doesn't actually give them to you. For example, the Print dialog box includes many things that are grayed out—they simply aren't supported in this release. So get them out of the dialog until you offer the support!

Along similar lines, Predictor/2 includes a word-processing mode with automatic word wrap and paragraph reflow. Just as certain extensions can trigger syntax assistance for some languages, an extension can automatically trigger word-processing mode. This feature is, however, quite embryonic. It requires tabs to get to the left margin, for example, and is unable to do many other things you would expect a real word processor to handle.

Word processing, however, is not the main function of Predictor/2, and that fact determined the amount of attention it was given during develop-

Windows Test: Quicken 4

Quicken enjoys a huge advantage over other packages in the home-finance market. Consequently, Microsoft dumped their also-ran Microsoft Money product on Novell and purchased Quicken from Intuit. At about the same time, Quicken 4 was released, and a product that many had enjoyed on OS/2 no longer ran in a Win-OS/2 session.

Fortunately, this sad coincidence can be resolved. A patch is available from IBM that fixes the problem. As I write this column, it still isn't available from their 800 number, so you must call (407) 994-5544 and request APAR PJ13282.

Other than that...

Quicken installs fine in a windowed Win-OS/2 session. It is in the migration database, which means that OS/2 will recognize it and assign it default settings if you add it to the Workplace Shell desktop. I had no problems using Quicken with the default settings OS/2 provided, but they do differ from the ones that Intuit recommends. Should you encounter problems, though, try switching **WIN_RUN_MODE** to 3.1 Enhanced Mode. If you're not going to be exchanging information between Quicken and OS/2 programs, set **WIN_DDE** and **WIN_CLIPBOARD** to off for a speed improvement.

You may see some speed improvements when loading Quicken by changing the **DPMI_MEMORY_LIMIT** to 80 from the 64 that OS/2 assigns. If you're already swapping heavily, though, this can do more harm than good. Quicken uses few separate XMS handles, so you can lower it a bit from the default 32 to free up some conventional memory, but don't go below 25. You can also speed it up by raising the **XMS_MEMORY_LIMIT** from the 2,048K that OS/2 assigns it to 6,144K. If you're not swapping heavily, you can try raising this number even further to improve performance.

ment. I tend to feel that if they aren't going to fully implement something, they should just leave it out.

Block marking is a bit odd. You position the cursor at the end of the block, then move the pointer to the beginning of the block to mark it—moving the cursor unmarks the block. I'd like to see Predictor/2 support an explicit end-of-block mark so I could move the cursor as desired without losing my mark.

Finally, PEL is a great macro language—make no mistake about it. But I really have no desire to learn another macro language. Attention vendors: REXX is the macro language for OS/2. Stop reinventing the wheel. Compuware acknowledged that they had heard this complaint before and are considering REXX support for a future release.

Glee or flee

Predictor/2 is a strong contender in the programmer's editor market. It provides a lot of functionality in a relatively easy-to-use package. If you're not satisfied with your current editor, I suggest you evaluate Predictor/2. On the other hand, if you're a fervent worshipper of your current product, chances are this one won't change your mind.

Brian Proffitt has been in the computing industry for 20 years. He was part of IBM's OS/2 team, left IBM to become the direc-

tor of PC Week's Corporate Labs, and is now the president of Visionary Research. Brian is the author of two books on OS/2, is a contributing editor for OS/2 Developer and a Senior Contributing Editor for OS/2 Magazine. He can be reached on CompuServe at 75300,1466, or Internet 75300.1466@compuserve.com.

RESOURCES:

PMDMatch 1.09 (\$25)

Leading the Way
427 Haverford Rd.
Ramona, CA 92065
(800) 414-4268
(910) 791-7052
(910) 350-2937
Available on CompuServe's
OS2BVEND forum libraries
CompuServe: 71333, 2463
Single user: \$25, site license: \$350, multi-site
license: \$1000
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Predictor/2 2.0 (\$249)

Compuware Corp.
31440 Northwestern Hwy.
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A close look at OS/2 Warp 3.0 reveals a
product that generally lives up to its hype
BY THE EDITORS OF *OS/2 MAGAZINE*



OS/2 Warp: The Next Generation

Introduced on October 11, 1994, and generally available to customers in early November, OS/2 Warp 3.0 has an interesting road ahead, with challenges and opportunities for customers and IBM executives alike. On the technical side, OS/2 Warp offers compelling features, such as smooth preemptive multitasking and 32-bit performance. OS/2 Warp extends OS/2 2.1's Windows compatibility with its new support of Windows 3.11 and Windows for Workgroups 3.11. It appeals to a less technical crowd, with easier installation, reduced minimal hardware requirements, a cleaned-up tutorial, and bundled starter applications. It's even playing to the current Information Superhighway mania with built-in Internet support.

Anyone who's been keeping in touch with OS/2 users knows that OS/2 Warp has been eagerly anticipated by True Believers, from Team OS/2 volunteers to corporate customers who have demanded a less resource-intensive operating system. For most OS/2 2.x users, the question isn't "Should I upgrade?" but rather, "Where can I find it, preferably on CD-ROM?"

Alas, many potential OS/2 Warp customers have been confused about their ability to run this new release. The OS/2 Warp 3.0 version reviewed here should have been called "OS/2 Warp 3.0 for Windows." It does not include the Win-

First Things First: 10 Quick Projects

After you're run through OS/2 Warp 3.0's installation procedure, IBM thinks that you're ready to work—but here are 10 tasks that we recommend you do right away.

1. Create utility disks. OS/2 Warp includes a utility to create backup disks. These floppies can be used to boot your PC if OS/2 Warp becomes damaged. To build these floppies, open the System Setup folder and click on the Create Utility Disks icon. You might want to make a couple of sets, just in case.

2. Archive your Desktop. This version of OS/2 can automatically make backups of the OS/2 Desktop's status, containing images of the last three times you booted your computer. This feature is not activated by default, but you should turn it on right away. Right-mouse click on the Desktop and choose Settings from the menu. Then go choose the Archive tab on the Notebook and turn on the option.

3. Activate undelete. OS/2 comes with a built-in undelete feature, which stores files you erase using OS/2. By default, this feature is disabled. To turn it on, first make a directory to hold the deleted files by opening a DOS or OS/2 command prompt and typing `md c:\delete`. Then, edit `config.sys` and remove the word **REM** from the line that reads **REM SET DELDIR=C:\DELETE,512**, and reboot. From now on, the last 512K of files that you deleted from your `c:` drive will be recoverable via the Undelete command. If you'd like to preserve more files, increase the parameter.

4. Limit the system sounds. If you enjoy system sounds, but want to speed up the Workplace Shell, you might choose to disable the window opening and closing sounds. Simply choose System Setup, open the Sound object, highlight the Opening Window (animated) and Close Window (animated), then choose None for the associated sound.

5. Eliminate unneeded caches. If you don't use HPFS disk partitions, you can save memory by removing the HPFS cache. To disable HPFS, put a **REM** in front of the **IFS=C:\OS2\HPFS.IFS** line in `config.sys`.

6. Make an IBM Works data folder. If you choose to use IBM Works, which is an integrated productivity application found in OS/2 Warp's BonusPak, you probably won't want all of your data documents stored in the `c:\ibmworks\data` directory along with the P.M. data—that'll make it harder to backup your data, and more dangerous to clean house. Create your own data path—perhaps on a different hard disk—and tell IBM Works to use it. Open the IBM Works program and select Preferences. Then, under the document tab, set the directory in which you would like your documents to be placed.

7. Turn off confirmations. To prevent meaningless little status windows from popping up whenever you perform a basic action such as copying or deleting a file, open the System object in the System Setup folder. There, under the Confirmation tab, you can choose which confirmations you really need.

8. Set SVGA. Even if OS/2 Warp supports your high-resolution graphics board, OS/2 starts up in regular 640x480x256 mode most of the time. To switch to a higher resolution or change the number of colors, open the System object in the System Setup folder. If your board is supported in SVGA mode, you'll generally see a series of resolutions; pick the one you like and restart OS/2. (Note: Not all graphics drivers included with OS/2 Warp 3.0 support resolution setting through the System Setup folder.)

9. Associate your graphics files with the Multimedia viewer. OS/2 Warp 3.0 includes a Multimedia viewer, named `ib.exe`, which can display animations and pictures and play sounds. If you "associate" all of the graphics files you use with `ib.exe`, you can double-click on the graphics' icons to play them. Find `ib.exe`, right-mouse click to pull up the menu, and select Settings. Under the Associations tab, add all your favorite graphics file formats to the list (such as `*.gif`, `*.pcx`, `*.bmp`).

10. Start scheming. The new scheme palette will even change background bitmaps on the OS/2 Desktop. Right-mouse click on the desktop, select System Setup, open the Scheme palette, and start dragging onto the desktop until you find a color scheme that's right for you—Alexander Antoniadis, Assistant Editor.

OS/2 program. In other words, if you want to be able to run Windows 3.x applications, you'll need to purchase and install a genuine copy of Microsoft Windows 3.x on your computer, preferably before installing OS/2 Warp. That means that today's OS/2 Warp 3.0 is not a recommended upgrade for OS/2 2.1 or OS/2 2.11 "full-pack" users who rely on Windows support through IBM's Win-OS/2. If you're a "full-pack" customer, you'll need to wait for IBM to ship a version of OS/2 Warp with Win-OS/2 included. The name and availability of that product were not yet announced by IBM at press time.

If you've been following the computer-industry trade press or reading the new Windows-centric computer columns in magazines like *Business Week* and *Newsweek*, you've probably realized that technology alone won't decide OS/2's success or failure in the marketplace. OS/2 Warp 3.0 is the best version yet—but will it play in Peoria? In other words, will the tens of millions of Windows 3.x users give OS/2 Warp at least a test drive, or will they automatically upgrade to Windows 95? Will those DOS users who never embraced a graphical user interface find OS/2 Warp the road to a 32-bit future, or will they cling to their command prompts? Will power users owning RISC and symmetric multiprocessing systems find their best solution in OS/2 Warp, or will they stick to UNIX or migrate to Windows NT? Those are the real questions for the OS/2 community, which needs to grow to survive. But those are questions for another day—maybe in mid-1995, when Windows 95 actually ships.

Today's question: How good is OS/2 Warp 3.0, especially compared to IBM's claims of easy installation, 4MB performance, and Internet access? In this in-depth report, *OS/2 Magazine's* contributing editors examine the latest version of OS/2, from soup to nuts—well, from tutorial and documentation to performance and the Internet. In the months ahead, we'll continue our coverage of IBM's latest personal-computer operating system—Alan Zeichick, Editor-in-Chief.

Up and Running: Installation

I don't know how many times I've installed OS/2 over the last seven years.

Every time, it was the same thing. Stack up the disks and answer the same basic questions in the same order. With the release of OS/2 2.x, things improved slightly. Even so, installation was still boring and not for the timid. With the release of OS/2 Warp 3.0, IBM has finally acknowledged that OS/2 won't be loaded only by corporate MIS/DP specialists and has entered the modern user-friendly age for system installation.

Still, the best way to install OS/2 Warp is to let someone else do it: Demand OS/2 Warp preloaded on your next PC. Granted, today few PC makers offer to preload OS/2, but with luck, that will soon change. The second-best way is to install OS/2 from CD-ROM—it's faster and much easier than using 35 floppy disks (and spending about two hours feeding them into your floppy drive). These notes will primarily focus on floppy-based installations, which are trickier, but our comments apply equally well to the CD-ROM version.

If you install OS/2 Warp yourself, the first thing you will notice, when you open the box, is the new and improved documentation. The *User's Guide to OS/2 Warp* is easy to follow, covers the major options and even includes a usable troubleshooting section.

Before you install, check your hard disk for free space. The old OS/2 2.1 "full pack" (which included IBM's version of Windows) filled about 40MB; OS/2 Warp 3.0, without IBM's version of Windows, takes almost 60MB (with some components from the BonusPak).

Once you get past the space requirements, you must decide to use the Easy or Advanced installation. The Easy installation places OS/2 Warp in the same partition as your existing DOS system (Windows doesn't have to be in this partition, despite the suggestion in the manual). This means your DOS partition needs 40MB to 80MB free space. If you don't have that much room, use Advanced Install to place OS/2 Warp in a larger partition.

Easy Installation assumes you intend to install the complete system, including Dual Boot. The manual covers how to install DOS after you've installed OS/2 to activate Dual Boot, a process not supported with prior versions of OS/2. To install OS/2 Warp, follow the instructions, stuff the floppies into the drive, and you're ready for the graphi-

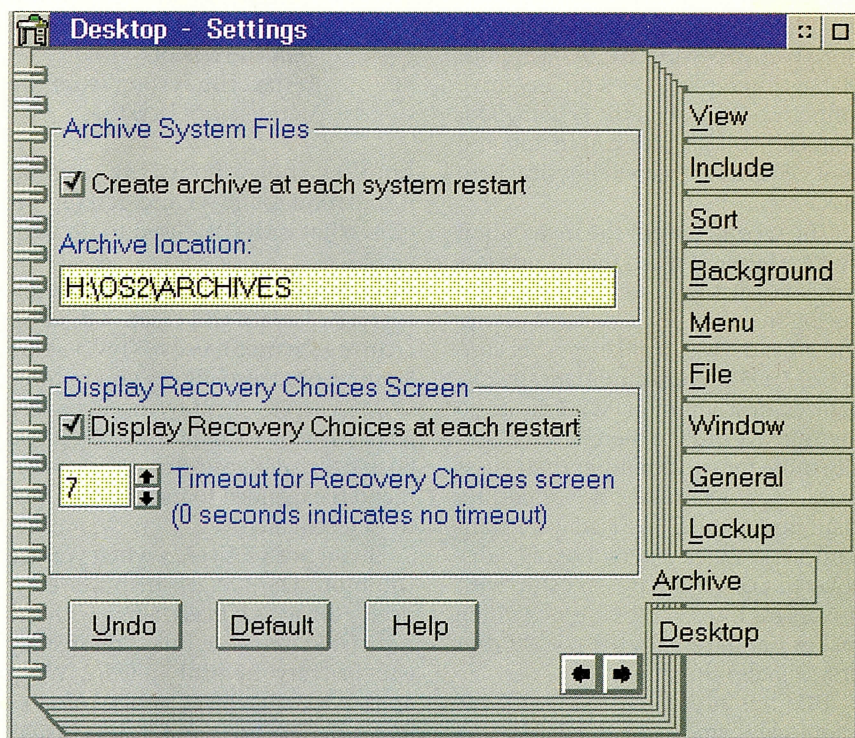


Figure 1: The Desktop's Settings notebook includes an option to automatically archive the Desktop each time you start OS/2 Warp.

cal part of the installation. If any of the following conditions apply you must use the Advanced Install:

- You want to install OS/2 on a drive other than c: (including a logical drive or a different physical hard disk), which requires Boot Manager.

- You want to format the boot volume or use HPFS.
- You want to change the way your hard disk(s) is (are) partitioned.
- You don't already have DOS installed on your boot partition.

Advanced Install (basically, the OS/2 2.x

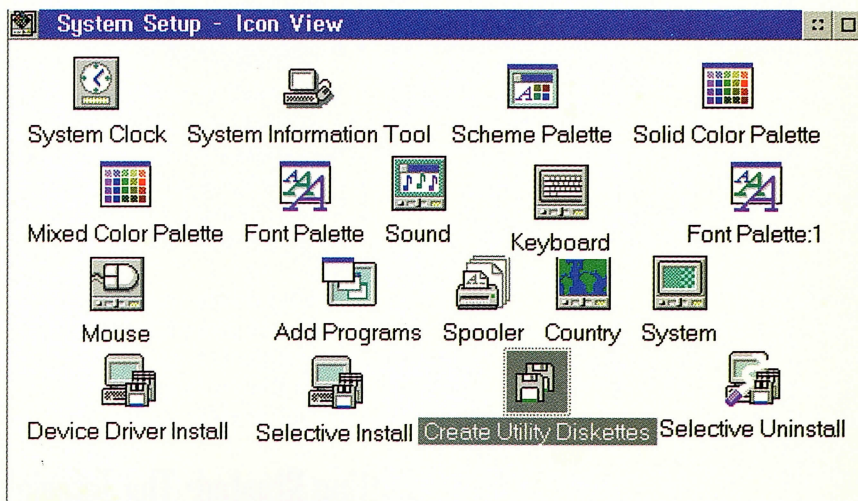


Figure 2: OS/2 Warp contains utilities to build boot floppy disks, to be used for emergencies, and Selective Uninstall, to remove unneeded features and files.

installation program with some revisions) allows you to install Boot Manager and place OS/2 on any drive (primary or logical) in the system. Boot Manager will also let you install and boot OS/2 from a second physical hard disk.

The second part of the installation process allows you to install printers (yes, you can now install more than one during installation), CD-ROM drives, and other devices. Unlike prior versions of OS/2, OS/2 Warp automatically recognizes most common PC hardware, so the System Configuration screen is usually more for confirmation than guess work. For example, it called my Diamond Stealth 64 S3 adapter standard VGA. When I went looking, I discovered OS/2 Warp doesn't ship with drivers for my S3 chipset (964) which makes standard VGA the correct (but unfortunate) choice.

IBM has added MMPM/2 and the Mah-Jongg game to the standard installation menu. This change is welcome; prior versions of OS/2 required a separate installation for multimedia and hid the installation instructions for Mah-Jongg in the *readme* file. OS/2 Warp also installs a second Maintenance Desktop that provides access to the information folder and the System Setup folder; if you make changes to the Maintenance Desktop, your regular working desktop is unaffected.

One important note: Quite a few people suggested to IBM that REXX should not be an installation option. IBM listened! With OS/2 Warp, REXX is always installed.

Once you get OS/2 up and running, there are a few options that you should know about. Prior versions of OS/2 required that you either boot from floppies or a maintenance partition if you wanted to fix problems with OS/2's critical *.ini* files. OS/2 Warp adds new recovery options that obviate this requirement. If you watch the screen while OS/2 Warp boots, you will see a "blob" and "OS/2" in the upper left corner of the screen. This blob doesn't stick around for very long. If you press and hold <Alt+F1> while the blob displays, you will see a Recovery Choices menu. This menu offers the following choices:

<ESC> Continue the boot process.
C Go to command line.

V Reset primary video display to VGA and reboot.
M Restart the system from the Maintenance Desktop.

Another choice boots the original installation *config.sys* and desktop—it does what <Alt+F1> used to do with OS/2 2.x.

In addition, if you modify a desktop setting, OS/2 Warp will create a desktop archive each time it boots. This Desktop Settings page also allows you to force OS/2 Warp to display the Recovery Choices menu each time it boots. If you enable the archive feature, the previous menu is expanded to include the three most recent archives.

If you press <Alt+F2> when you see the blob, OS/2 Warp displays each device driver as it loads, along with the associated *config.sys* line. This display can be very helpful if OS/2 Warp appears to stall when it boots. <Alt+F1> and <Alt+F2> are mutually exclusive: You get to pick one, not both. If you've set OS/2 Warp to automatically display the Recovery Choices menu, <Alt+F2> won't work.

Occasionally, the Recovery Choices menu might not provide an appropriate option (for example, if you want to run CHKDSK on the boot volume). OS/2 Warp provides the ability to create a set of utility floppies that you can boot from. The System Setup folder contains an object called Create Utility Disks, which creates a three-disk set. Use Disk 1 and Disk 2 to boot OS/2 Warp, then insert Disk 3 to run CHKDSK or other tools.

Another System Setup object is Selective Uninstall. It provides the capability to uninstall components of OS/2 Warp. It is somewhat intelligent; for example, if you installed HPFS and actually have one or more HPFS drives in your system, you won't be able to uninstall HPFS.

There's no doubt that OS/2 Warp 3.0's installation procedure is a tremendous improvement over OS/2 2.x; IBM's learning, and we're benefiting—*David Moskowitz, Contributing Editor.*

Getting Started: The Tutorial

First impressions are indeed lasting ones. In the case of software, if the first impressions aren't good enough, users

may give up on the product before they ever begin using it. At the very least, a bad beginning plants serious doubts in users' minds that the product must then overcome. In other words, even if the tutorial is only used once, it is nonetheless a critical component.

Shooting for that good first impression, IBM invested a lot of development time in a new tutorial for OS/2 Warp. *Using OS/2* starts with basic mouse movement and guides the user through a wide range of topics to build mastery of the Workplace Shell. The new tutorial makes much better use of graphics, and dynamically changes an information window to describe the purpose of the area currently under the mouse pointer. By the way, it's still true that you can run OS/2 without a mouse, but it's a very painful process and the tutorial is little help in learning the techniques needed. That's not a complaint—there is no value in misleading users into thinking that the Workplace Shell was designed to make keyboard use easy.

The tutorial is very complete, explaining what objects are, and the drag-and-drop techniques that can be used to manipulate them. Users are also introduced to the Launch Pad, installing and running applications, using multimedia functions, and creating and customizing folders. Other customization topics include the use of the color and scheme palettes.

A really useful feature of the tutorial is the Practice button. The tutorial window disappears, and a small information panel pops up to guide you through trying a specific technique directly on your own desktop. Another interesting addition is that the tutorial is effectively composed of three different levels. Initially, the tutorial targets the computer newcomer. Through pushbuttons, the user can also see comments relating any of the techniques to those used in Windows. This comparison can really speed the process of orientation for users who are moving to OS/2 from Windows. A third level is aimed at the power user, and describes different or more detailed methods of accomplishing a task.

Users who are still struggling with OS/2 can take advantage of the tutorial's Do It option. Like the Practice button, Do It removes the Tutorial window and

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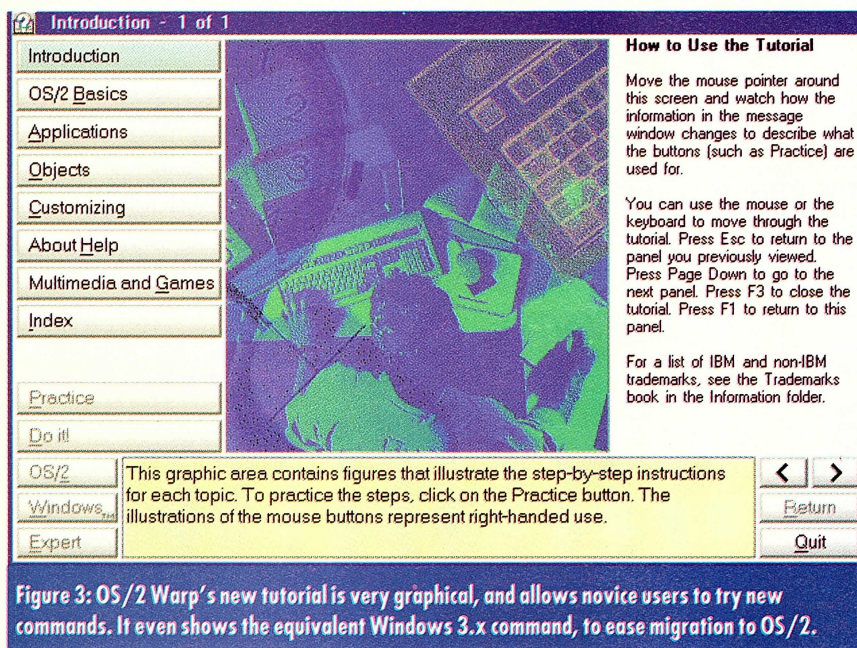
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brings up an information panel describing application of the current topic to your own desktop. Do It also goes a step further, and actually performs the specified action while you watch. This idea is great, but it would be even better if the Do It button wasn't grayed out (inactive) during so much of the tutorial. Another problem is a bug that occasionally caused the Do It window to disappear. The Window List still showed the Tutorial as being active, but it couldn't be re-displayed. I had to shutdown and restart to get the tutorial back—before getting to the section of the tutorial that explained how to shutdown.

Despite the bugs, the new tutorial is an excellent introduction to OS/2 Warp. IBM deserves an additional nod for bringing the tutorial up immediately after the first post-install boot of the operating system. While the desktop is

Look it Up: Documentation

It is widely known that a major Big-Blue motivation for developing OS/2 Warp 3.0 was the need to achieve acceptable OS/2 performance on "low-memory" PCs. ("Low-memory," of course, refers to those pandemic machines with a pathetic 4MB RAM; any sub umbra, third-world PC with less than 4MB is now dismissed as a "no-memory" system.) Clearly, the plan is to encourage PC manufacturers to pre-install OS/2 on affordable platforms, as well as enticing post-installation by the adventurous millions with limited RAM and dollar resources. More possibilities lie in the potential corporate market, which is growing impatient over Windows 95. Either way, IBM expects a significant influx of first-time OS/2 users, and my task is to assess how the new OS/2 Warp documentation meets this challenge.

Let me say at once that IBM has achieved a comparable miracle of efficient condensation with the new OS/2 docs. The OS/2 Warp documentation fills 404 pages, compared with OS/2 2.1's forest-depleting 734 pages. OS/2 2.1 weighed in with a 183-page *Installation Guide*, a 545-page *Using the Operating System* manual, and a six-page *Quick Reference*. The equivalent OS/2 Warp docs come in a single, low-fat *User's Guide* that turns out to be a more logical and readable manual for OS/2 newcomers but without the loss of significant bits. For example, the previous, somewhat confusing former *Installation Guide* is now simplified and occupies two widely separated sections of the *OS/2 Warp User's Guide*: "Using Easy Installation" (Chapter 2) and "Advanced Installation" (Chapters 17-19).

Ease of installation was another key goal for IBM, anxious to counter the prevalent mix of myth and fact regarding OS/2's initiation rites. OS/2 Warp is much smarter at diagnosing the ratbag of peripherals, boards, firmware, and software known collectively as "your cherished system." If you are prepared to accept OS/2 Warp's intelligent default settings based on your platform, you really do get nearly "one-button" installation. The "Easy Installation" chapter, therefore, is less fussy, leaving advanced customization and special hardware considerations to the final three chapters.

Of course, if your Dell or Compaq arrives pre-Warped, you can move on immediately to Part 2 of the OS/2 Warp docs, "Exploring OS/2" and then

on to Part 3, "Using OS/2."

If you compare the equivalent sections in the OS/2 2.1 manual, you'll see how space and sanity have been preserved. The OS/2 Warp pages are more compact. For instance, the old Chapters 8 and 9 on the Productivity and Games folders are sensibly combined into a four-page Chapter 12, "Using Tools and Games" chapter, and we are spared the old legend: "The Games folder provides you with entertainment."

Equal parsimony is achieved with the BonusPak docs: a mere 14-page booklet (really 10 pages if you discount the boring Appendix A [trademark and patents stuff]) and three slightly less boring blank pages for your own, unspecified use. Of course, the booklet cannot do justice to the nine BonusPak applications. It simply outlines each application and tells you how to install it. For more detailed information, you are referred to the copious on-line help files. The BonusPak spans 14 floppy disks in addition to the 21 disks for OS/2 Warp itself, so the CD-ROM version is definitely recommended.

The OS/2 Warp set also contains an updated *Sources & Solutions* catalog, with 180 pages of third-party OS/2 products including hardware, software, publications, services, and courseware.

The new OS/2 Warp docs are most impressive and I noted only a few signs of haste. Although the old chore of explicitly "migrating" programs has disappeared (it's now done entirely by the System Setup Add Programs object), there's still a phantom index entry for "migrating programs" misdirecting you to p. 48. To provide continuity for OS/2 2.1 users, a cross-reference from "migrating" to "Add Programs" should be provided. A final, minor niggle is that the Glossary needs a big tidy by competent lexicographers. The Glossary repeats the horrors of the 2.1 version (with a few welcomed corrections) and hardly justifies its 30-odd pages. The entries at "data," "file," "job," and "system" are surely superfluous and/or wrong. And consider the mysterious Win-OS/2 defined as "a feature of OS/2 that enables OS/2 to run supported Windows programs." Ah, all is clear. OS/2 supports supported Windows applications—*Stan Kelly-Bootle, Contributing Editor.*

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being created for the first time in a different thread, the user sees something meaningful and helpful on the screen right away—*Brian Proffitt, Senior Contributing Editor.*

Point and Click: The User Interface

OS/2 2.x, like well-constructed furniture from an unfinished-furniture store, was solid, reliable, and an excellent value. However, to make OS/2 really shine, you had to know how to customize it, just as you need sandpaper and a can of stain to bring out the beauty in that new chest of drawers. A lot of people don't know how to do that, or don't want to invest the time and energy to learn.

OS/2 Warp 3.0 smooths many of the rough edges in OS/2's user interface. The fit and finish is much improved; you no longer run into the binary equivalent of splinters. Even better: if you're an experienced OS/2 user, the changes made to the user interface won't confuse you. What you already know is enhanced, not changed beyond recognition. IBM did a good job here.

OS/2 Warp is polished and prettier. It installs in color, and its icons are bright. OS/2 Warp's interface is also more consistent; most of the system folders now look like folders instead of program objects. When you open a folder, the icon changes to display an open folder. At first glance, this feature may seem cosmetic, but it really helps you to keep track of what's open.

If you used an earlier version of OS/2, you'll be delighted by dozens of small changes. For example, if you ever accidentally hit Arrange on the desktop menu, you'll be happy to discover a new Unarrange option. It's a sure bet that, as an experienced user, there were a few times when you fumbled your mouse clicks and selected Open... Program when you really meant Open... Settings. Since OS/2 would thereupon start the program whose settings you were trying to fix, this mistake was frustrating. The Settings choice is now moved to the main part of the right-click menu option. It's a small thing, but one that caused me to heave a great sigh of relief.

The color, font, and scheme palettes have been expanded and improved.

Earlier versions of the scheme palette made me think that the few choices were designed by guys who wear boring suits and were afraid to offend someone by using a bright color. The schemes included now have a broader range of options, from a restful scheme with a pine bitmap background to more staid grays. Two color palettes are now available, each with more color choices. In general, OS/2 Warp offers more options all around—in the folder Settings Notebook, for example, you can adjust more colors and fonts than you could before.

Some features were added to the user interface to make life easier for laptop computer users. You can change the size and color of the mouse pointer, so that it's big enough to see. It also includes a comet cursor feature, which is useful when you lose the mouse pointer on your laptop screen. The comet cursor will leave fading visible dots behind the mouse as you move it around, so your eye can quickly find the cursor; it's customizable, and it works well.

One of the major differences in the OS/2 Warp user interface is its new Launch Pad. With a single mouse click on the Launch Pad, you can start applications, open folders, shut down your system, or work with objects. It's an organizing tool that can clean up your OS/2 desktop and reduce clutter.

Customizing the Launch Pad is extremely simple. To add an item to the Launch Pad, you drag-and-drop the desktop object onto the Launch Pad or into one of its drawers (sort of sub-folders on each Launch Pad button). To remove one, you drag-and-drop the item onto the shredder, and the Launch Pad will resize. It's easy enough to use that you could change it around three times a day.

I confess that I don't particularly like the Launch Pad. It's not by a lack of quality, design, or implementation; it simply doesn't work the way I like to work. I've already constructed my own conventions for project-based and application-based work folders, and I'm happy with them. I suspect that I am in the minority on this opinion. However, you might love the Launch Pad, so please try it. At any rate, much of the beauty of OS/2 is its flexibility; it's easy enough to leave out that feature. The Launch Pad is a new item in the SET

AUTOSTART line in *config.sys*; just delete its reference if you don't want it to automatically start.

In OS/2 2.x, creating a new program object could be awkward. You'll find several improvements here, too. Once you type in the application's path name, OS/2 Warp queries both the object and the application database. (It's the same database used during installation, when you migrated existing applications.) OS/2 Warp automatically changes the icon (as OS/2 2.x did) and the name of the application, so you don't have to go to the General page of the notebook to type it in. More importantly, OS/2 Warp inserts the DOS and Windows settings from the application database. Since the size of that application database has been significantly increased, this feature should reduce installation headaches, especially for new users who aren't prepared to fuss with stuff like memory and video settings.

OS/2 2.x's Find function, which was so slow and awkward as to be nearly useless, has been substantially improved in OS/2 Warp. It's fast and multithreaded now, and somewhat less obscure—I might actually begin to use it.

OS/2 Warp permits you to set a folder option that closes the outside folder when you open an object inside the folder. For example, if you have a Word Processing folder, the folder can automatically close when you start a program therein or when you open another folder inside the Word Processing folder.

One substantial improvement has been in OS/2's recovery features. In OS/2 2.x, you had to boot from the installation disks more frequently than you wanted to admit, to maintain or fix the system. OS/2 Warp adds a suite of recovery features, accessible if you press the (now documented!) <Alt+F1> while the system is booting. From the menu presented, you can choose to boot using archived system files, go to a command line (ideal for editing a recalcitrant *config.sys*, especially since a text-based tiny editor, TEDIT, is now included), set the display to VGA, use a customized *config.sys*, or boot to a maintenance VGA-based desktop. The only remaining reason to boot from the installation disks is to perform a CHKDSK on your boot drive.

In the Desktop Settings notebook,

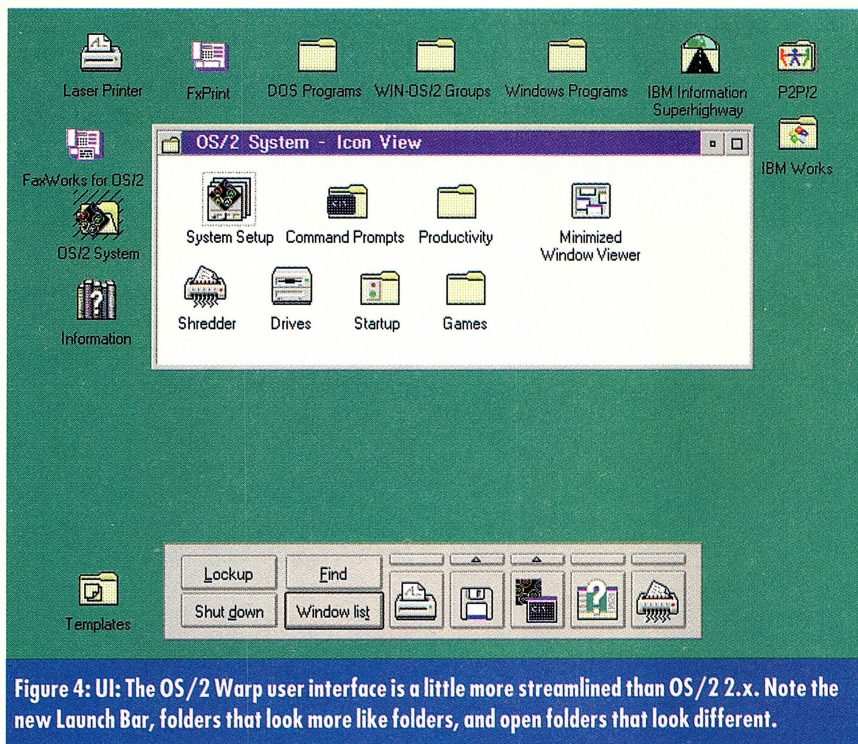


Figure 4: UI: The OS/2 Warp user interface is a little more streamlined than OS/2 2.x. Note the new Launch Bar, folders that look more like folders, and open folders that look different.

you'll find an option to let you automatically backup the system files (*os2.ini* and *os2sys.ini*) every time the computer boots. Optionally, you can choose among these archived files on every system boot. In addition to providing a sensible way to prevent system failures, a clever user could figure out how to use this feature to create different desktops for, say, each member of the family.

Here's something new: If you don't agree that OS/2 Warp, or some of its accessories, are the best thing since chocolate icing on chocolate cake, you can now get rid of them. The System Settings folder now contains a Selective Uninstall, so you can remove OS/2 or any of its features you no longer need—*Esther Schindler, Contributing Editor.*

Smaller, Faster: 4MB System Performance

To you and I, computers are nifty toys worth fiddling with and worth investing time and money in. We're in the minority, however. When Mr. and Ms. America go to the electronics superstore to buy a computer, the system they bring home is likely to include only 4MB RAM. They are about as likely to take off the cover on their new comput-

er to upgrade their RAM as you are to take apart your new washing machine. To become a success in the consumer market, OS/2 had to address the needs of those users.

As a result, when IBM began working on this version of OS/2, it emphasized performance improvements for those low-resource systems. IBM asserted that OS/2 Warp will "run comfortably in 4MB" in its promotional material, so we felt compelled to determine if the statement was accurate.

I installed OS/2 Warp on a 4MB IBM ThinkPad 350C, and lived with it for a couple of weeks. During that time, I took the laptop on a cross-country trip, where I needed to keep in touch with the home office via modem, research information on CompuServe, and write articles.

The ThinkPad might advertise itself as a 4MB system but, as with many computers, the BIOS steals a bit of that. So the system was really running with 3.7MB RAM. (I contemplated using another system with a true 4MB instead, but IBM sells the ThinkPad 350C as a 4MB system, so I let it stand.)

I set up the 33MHz 486-based ThinkPad with its limitations in mind—nothing above 640x480 VGA, no multimedia support. For over a week, I lived without Windows applications, as I was

certain that they would place a tougher demand on a 4MB system than the less-burdensome OS/2 and DOS applications. Real-world performance in 4MB was disappointing. (I loaded Windows later on, but Windows application speed was a moot point by then.)

As a CompuServe systems operator (sysop), my mainstay application is Golden CommPass, an OS/2 navigation program that takes advantage of OS/2 features such as multithreading and drag-and-drop. However, Golden CommPass 2.11 requires 6MB to run, even under OS/2 Warp. Attempting to use it crashed the system. For the week on the road, I had to go back to Tapcis, a DOS CompuServe navigator that worked like a champ even in the low-memory system.

Starting applications in a 4MB system takes a painfully long time. Opening folders took so long that I often wondered if the system had registered my double-click. Once the application is running, however, most applications run acceptably—though never briskly. If you work with only one or two applications that you load at the beginning of the day and rarely switch between them, you might be willing to work this way. However, you'll immediately feel an overwhelming compulsion to find the money for a few more megabytes of RAM.

During that on-the-road trip, I had reason to demonstrate OS/2 Warp to a group of corporate users. I apologized for showing OS/2 Warp at its worst, but suggested that, unimpressive as its speed was, one might be willing to live with it on a laptop. "Yeah," said one of those users. "And you could walk back to Phoenix from Washington, too."

I'm no stranger to running OS/2 in low-RAM configurations. I wrote part of a book using a 16MHz 386SX laptop running OS/2 2.1 with 5MB RAM. In another situation, I squeeze OS/2 2.1 onto a 4MB 25MHz 386SX, along with the Novell Network requester and the RelishNet server. In that configuration, I had to give up the graphical Workplace Shell, but OS/2 would run. OS/2 Warp runs much faster than OS/2 2.x in low-memory configurations; however, you wouldn't recommend such a system to Mr. and Ms. America or, for that matter, to your mom.

A little RAM goes a long way. I

installed OS/2 Warp on the aforementioned 16MHz 386SX laptop, which is

maxxed out at 5MB RAM. The difference in performance was so striking

that, if the ancient laptop had the hard disk space available (it only has a 40MB drive, which is now entirely too small for OS/2 Warp), I would choose the 5MB 386SX over the 4MB (okay, 3.7MB) 486 system. If you think of this as a 25% increase in RAM instead of just one more megabyte, the speed improvement isn't all that surprising.

Once you're out of the low-memory situation, the entire story changes. OS/2 Warp's performance takes off once you reach 8MB RAM. On an 8MB 25MHz 386SX, the perceived system responsiveness was excellent. If you're serious about using OS/2 Warp, forget IBM's 4MB claims, and make sure your systems have at least 8MB RAM installed—*Esther Schindler, Contributing Editor.*

They're not Applets: The BonusPak

Back in OS/2 2.0, IBM introduced some new personal-productivity tools, commonly called "applets," into the operating system. These tools were an interesting addition to OS/2, but weren't really of the quality that you would expect in a shrink-wrapped product, even as free add-ons.

For OS/2 Warp, IBM really only had two choices—replace the applets with programs of higher quality, or drop them altogether. IBM decided to raise the bar for operating systems. Vendors of competing products may not be too thrilled, but users probably will be. Let's take a look at the components:

CompuServe Information Manager

Since being dragged reluctantly into the world of public electronic interaction four years ago, IBM has seen the OS/2 forums on CompuServe prosper and grow into vital communication vehicles. CompuServe has much more than OS/2 information to offer. If you're using simple terminal-emulation software, however, CompuServe's multiple-level menu interface can be painful to negotiate.

CompuServe Information Manager (CIM) provides a graphical interface that lets you forget about the mechanics of connection and concentrate on the information itself. Dig deeper into CIM, and you'll see that you can mark mes-

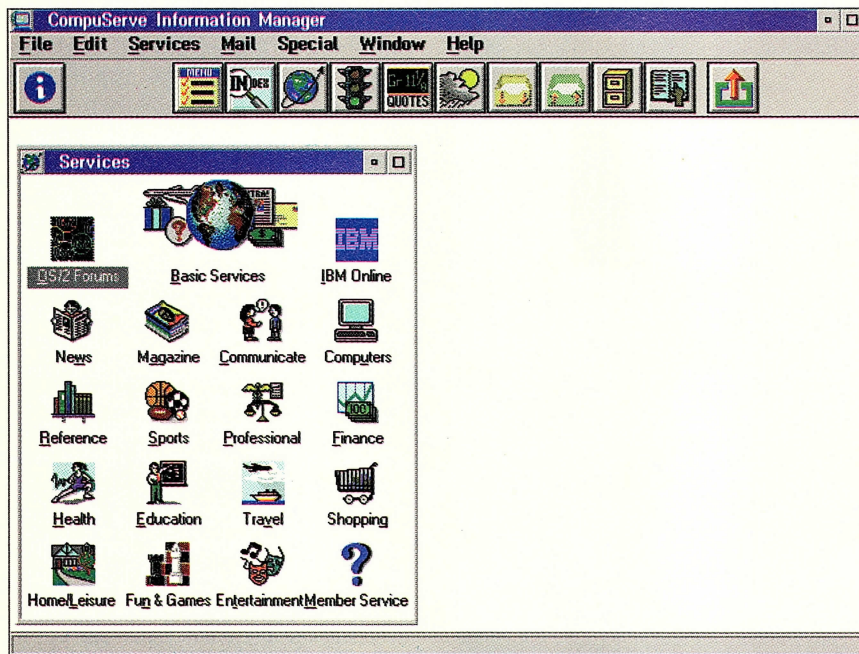


Figure 5 CompuServe Information Manager is included in the OS/2 Warp BonusPak. CIM allows users to maneuver through CompuServe using menus and buttons.

Do it your way: applications settings

Among the many enhancements in OS/2 Warp 3.0, you'll find that you have greater control over how your system and applications run. Some of these enhancements have been covered in other sections, but it makes sense to take a moment to look at a few of them specifically.

Many OS/2 users run lots of Windows applications. Starting up the first seamless Windows application can take a while, so it became popular to load a freeware program, *SEAMWIN*, in OS/2 2.x's start-up folder. *SEAMWIN* did nothing but load Windows, and just sit there, but since it was loaded at system start-up, it improved the speed at which seamless Windows applications loaded.

Warp now incorporates a similar feature. The Win-OS2 Setup program (in the System Setup folder) now includes an option called Windows Fast Load. If you turn on this feature, a stub of Windows will be loaded at system start-up. If you run Windows applications seamlessly, turn this option on to improve performance. (This task does not appear on the screen, nor in the window list. Even if you don't use the feature personally, if you support end-users who call you to complain that their system suddenly slowed down, you may want to check to see whether this box is check-marked.)

The DOS and Windows Settings page in the Settings notebook has also had a few changes. First, instead of being overwhelmed by a long list of options, you can look at a subset. For example, you can modify just the keyboard, memory, and video settings. This approach makes it easier to find the settings you want to modify, without making you wade through all the others.

Two new settings are provided. The Session Priority setting lets you control the priority of a specific DOS or Windows session. You can also enable or disable Adobe Type Manager support in a Windows application by toggling the new WinATM setting.

In earlier versions of OS/2, if you fussed with the settings for a particular program and finally got it right, you couldn't save that collection of settings. In OS/2 Warp, you can save and load settings from an encoded file. Now, once you get an application set up the way you want it, you can save the settings for backup purposes, share the settings with friends on a BBS, or pass them on to your co-workers—*Esther Schindler, Contributing Editor.*

sages or files of interest, download them at high speed, and then review them off-line—while CompuServe's meter is no longer running.

It's not as fast as it could be, but it helps you get started with the information service. If you like CompuServe, other OS/2 tools, such as Creative Systems Programming's very popular Golden CommPass, can save you even more on-line money.

Faxworks

Faxworks exploits OS/2's multitasking to smooth the process of sending and receiving faxes in the background. It also allows you to drag documents onto the fax "printer" to send faxes directly. Remember, though, that this monopolizes your modem. You must stop the fax-receive monitor to use your modem for other communications. Worse, an intermittent bug caused Faxworks to leave my modem in an untenable state for other communication software. I had to manually enter modem commands and save them in the modem's CMOS to reset it.

On balance, Faxworks is a highly functional product that is especially useful for those environmentally conscious enough to try to save paper, or for laptop, home-office, or small-office users without ready access to a fax machine.

IBM Works

If you combine the word processing, database, spreadsheet, charting, and reporting power of Footprint Works together with the contact, to-do, and time-management functions of Arcadia Workplace Companion, you get the new IBM Works. Earlier versions of both components have been reviewed favorably in *OS/2 Magazine*, and both benefit from their integration—not just with each other, but deeper into the Workplace Shell.

There's much more meat here than can possibly be covered in so short a space. IBM Works has some bugs, but will likely save thousands of people money by providing all the functionality they need for these basic business functions. (*OS/2 Magazine* will be pro-

viding more information about IBM Works in future issues.)

HyperAccess Lite

HyperAccess/5 is one of the more popular OS/2 terminal-emulation packages. This Lite version is remarkably functional for a bundled product. It contains most of the popular file-transfer protocols, including ZMODEM. The number of modem profiles included is somewhat sparse, but chances are good you'll find something reasonably compatible with your hardware. The dynamic help pop-ups are also a nice touch.

I missed the ability to enter modem commands directly in the terminal window, and I'd like to see the color and font palettes supported. The modem wasn't always left in a usable state upon exit from HyperAccess Lite, either. However, it is a giant step up from the Softterm emulator found in earlier OS/2 incarnations.

Person to Person

Person to Person is described as a "virtual whiteboard" utility. This incredible

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product allows people to connect their computers, either by network or modem, and communicate interactively. Participants can send text messages, share files, share a virtual chalkboard onto which each user can draw objects, and even (if you have ActionMedia II) share live video. While not entirely the state of the art, Person to Person allows OS/2 Warp users to take groupware to a new dimension with real-time information sharing.

Multimedia Viewer

Multimedia Viewer solves two inadequacies in OS/2 2.x—the Picture Viewer didn't support any of the popular image formats, such as GIF, TIFF, and PCX, and the digital video and audio players made it difficult to browse more than one multimedia object at a time.

The Multimedia Viewer makes these functions easier by creating a new folder type—a “light table” in which each multimedia object looks like a photo-

graphic slide to be manipulated. The interface takes some getting used to—you click on the slide border rather than the object itself—but the effort is worth it, as managing your multimedia objects just became much easier.

System Information Tool

The System Information Tool provides a wealth of low-level information about the hardware in your computer. You won't need this tool until you run into

The easy way: OS/2 Warp shortcuts

OS/2 Warp 3.0 has many new features and functions; we'll be covering them each issue in Tips and Tricks (this month on p. 68). Here are a few tips specific to OS/2 Warp.

Launch Pad

One of the most noticeable changes in the user interface (aside from the animated icons) is the Launch Pad. The Launch pad can be customized in many ways to make you more productive, and to make it suit your own tastes. First, you can change the size of the icons and determine which ones are displayed.

If you open the Settings, either by using its icon object or by right-clicking in a blank area of the Launch Pad, you'll see several options you can set, starting with Float on Top. This setting will cause the Launch Pad to sit on top of anything and everything on the Desktop. You can hide the frame controls, which are the title bar and minimize/maximize icons as well, to save screen space. You can always move the Launch Pad by dragging it. You can also choose to display the Launch Pad vertically.

One of the most useful settings closes a drawer after you use an object in it. By default, if you open the drawer (click on the bar over or next to an object on the Launch Pad) and click on one of the objects in it, the drawer stays open; you need to click on the bar again to close it. I find it convenient to have the drawer close automatically after I activate an object.

The other three options on the first page allow you to customize whether you'd like text displayed along with the icons, or if you want to use the small icon format to conserve as much screen space as possible.

Most people don't realize there's a second Launch Pad Settings page. It offers you the opportunity to display the four action buttons as miniature icons, text, regular-sized icons, or even to not display them at all. You may also notice that when the Launch Pad is displayed vertically, the action buttons are not placed in two rows of two, but on top of each other.

Don't like the Launch Pad? You can turn it off—and don't worry, you can always restart it at any time. To disable the Launch Pad, open up an editor and edit *config.sys*. In the **SET AUTOSTART=** line, remove the word **LAUNCH PAD** and the comma following it; next time you start OS/2 Warp, the Launch Pad will not start. However, be sure to close the Launch Pad before you shut down because, if the Workplace Shell saw it was running when you shut down, it will start it when you reboot due to that fact, even though you removed its entry in the **SET AUTOSTART=** line. To start the Launch Pad manually if you have disabled or closed it, simply double-click on its object, as you would with any other object.

If you don't like the default objects on the Launch Pad, change them! It's easy with drag and drop. You can drag any object on the Launch Pad to

the shredder (except for the four action buttons, where it's all or nothing). Objects on the Launch Pad are not originals: they behave like shadows, so you can move or delete them at will. To remove an object from a drawer, just open the drawer and use the right mouse button to drag it to the shredder.

To add objects, just drag them to the Launch Pad. When doing this, you'll notice an emphasis indicator that shows where the object will be placed when dropped. Using the indicator, you can reorder objects in the Launch Pad. By watching the emphasis on a drawer, you can add an object there.

Printing problem

I have two computers, a laptop and a desktop, connected to the same printer, and I installed identical printer drivers on both of them. One system would print and the other would not! If you have this problem, here's a likely cause and solution.

In OS/2 Warp, a change was made to the printer device driver, *print01.sys*, to speed printing. However, depending on the timing of the hardware and the chips on the cards, this speed increase can actually stop some OS/2 PCs from printing. By adding an **/IRQ** at the end of the **PRINT01.SYS** line in *config.sys*, you can force *print01.sys* to work the way it does in OS/2 2.x. Try it—it might solve the problem.

OS/2 credits

“Easter Eggs” are undocumented features of operating systems or applications that tell you about the programmers. OS/2 Warp has an Easter Egg, and you can find it if you've installed the optional bitmaps along with OS/2. If you're curious, click on an empty space on your desktop. Now, simultaneously hold down the <Ctrl>, <Alt> and <Shift> keys, and press the letter “O.” Wait a few seconds. (If you haven't installed those optional bitmaps, you can do so by running Selective Install, which is located in the System Setup folder.)

Context menus

One final little tidbit has to do with context menus. An obscure feature of the Workplace Shell allows you to set the context menus (the ones that come up when right-clicking on an object) to a restricted set of menu items. If you add a line saying **SET MENUSTYLE=SHORT** to *config.sys*, the context menus on your objects will not have the Copy, Create Another, Create Shadow, Move and Delete items. Adding this limitation is useful when your PCs are used by novices and you want to limit the available options for messing up desktop objects. Of course, they can still drag objects to the shredder, but this approach might slow them down a little!—David Reich, Contributing Editor.

some kind of problem, but when the technical-support department asks you about your system, this tool should provide all the info they'll need. Corporate help desks will want to make sure this tool is installed in every computer they must support.

Video IN

If you have a supported video-capture card—and MMPM/2 supports a large number, unfortunately excluding the popular ATI Video-IT—you can now produce your own video movies, using MMPM/2 and Video IN. This product makes it relatively easy to capture your own full-motion videos for use in presentations, video to attach to electronic mail, and so on. Since Video IN isn't required to play back the captured images, one copy in the MIS department allows you to create training videos that can be replayed on all client machines running OS/2. Another set of BonusPak applications are designed to connect OS/2 Warp to the Information Superhighway.

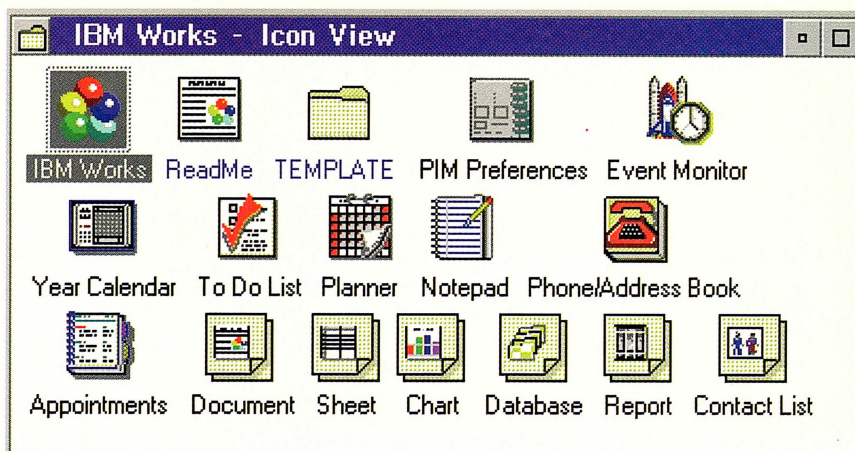


Figure 6: IBM Works is a combination of Footprint Works and Arcadia Workplace Companion. Its use of integrated applications and drag-and-drop is a good example of OS/2's capabilities.

One final note: Very little printed documentation is provided for the BonusPak. You should plan to spend a fair amount of time browsing the on-line instructions. But what do you expect for "free?"—*Brian Proffitt, Senior Contributing Editor.*

Information Goldmine: Internet Access Kit

IBM's decision to include the Internet Access Kit in with OS/2 Warp 3.0 not only let them capitalize on a mid-1990s



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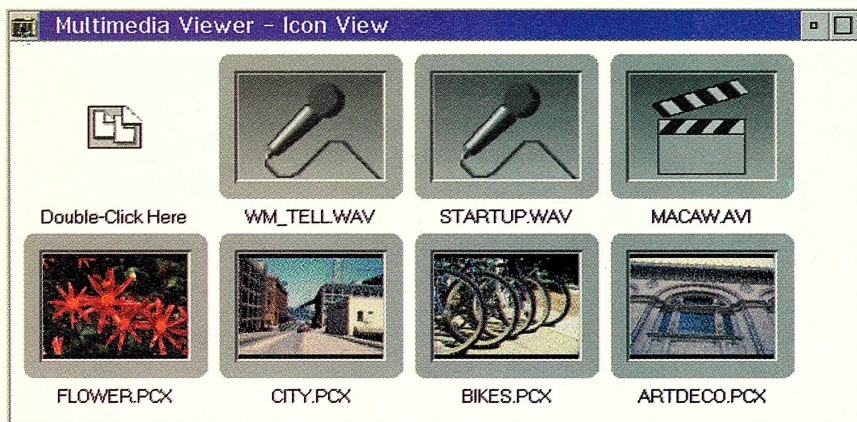


Figure 7: The multimedia viewer, included as part of MMPM/2, lets you listen to sounds, view images, and play animations. It can also be used in conjunction with UltiMail Lite, part of the Internet Access Kit.

craze, but uniquely positioned users to take advantage of their multitasking operating system for telecommunications. How good is this veritable Internet Swiss Army knife? Let's take a look.

The Internet Access Kit provides all the tools you need to be a good Internet citizen. It includes a mail utility for communicating with other denizens of the Internet; a newsgroup reader for browsing the thousands of usenet newsgroups; and gopher, ftp, and Telnet help you find and retrieve programs stored on remote computers. The all-important WebExplorer lets you explore the multimedia-rich World Wide Web. (For an overview of the Internet and its features, see "Cruising the Internet with OS/2," *OS/2 Magazine*, November 1994,

p. 30-37.)

The e-mail tool, UltiMail Lite, can send mail containing not only multiple text messages, but viewable images (in .gif and OS/2's .bmp formats only) and binary files, such as programs or data. If you're communicating with someone else who has UltiMail Lite, you need not worry about the limitations of the "text-only" Internet, since UltiMail automatically converts binary data to and from Internet-compatible characters. The interface is nice, supporting drag and drop to add or extract files out of messages. A big weakness: UltiMail Lite includes its own rather Spartan address book. It's too bad that IBM didn't choose to demonstrate the power of object-oriented programming by reusing IBM Works' more powerful

address book.

NewsReader/2, which lets you read Usenet newsgroups, is the same tool sold as part of IBM's TCP/IP kit. It uses a simple and functional interface, with one window for viewing the message information and another for actually reading the message. Note that NewsReader/2 only reads messages while you're connected to the Internet—and the meter's running if you use a pay-by-the-hour Internet provider such as Advantis. If you plan to regularly browse many newsgroups, you'll save money by using off-line readers, which download entire newsgroups to your hard disk or LAN, and let you read them at your convenience. (*OS/2 Magazine* will be reviewing off-line news readers in a future issue.)

OS/2 Warp's gopher, which finds files, is an update of a widely distributed freeway gopher written by IBM employee David Singer. It works just like any other gopher tool, letting you browse through any dedicated gopher server (which tracks files and topics), starting at the main gopher hub at the University of Minnesota. Gopher is easy to use—but you can perform the same tasks with the friendlier WebExplorer, and most people will probably choose to do so.

The WebExplorer, the most anticipated part of the Internet Access Kit, was still unfinished in early November, so it's not included in the first OS/2 Warp boxes. WebExplorer is the first OS/2 tool for graphically navigating the World Wide Web, the hot and most hyped place for surfing the Internet. WebExplorer is similar in look and function to the very popular Mosaic, a World Wide Web interface program available for most platforms, but not for OS/2.

WebExplorer beta 0.93, available at the beginning of November to OS/2 Warp owners, exploits OS/2's capabilities by letting you drag pictures from the interface to the desktop, and navigate existing documents while a new document is loading. Using WebExplorer, you can transparently access gopher sites, ftp, mail, and other Internet services from within the program.

Because WebExplorer downloads lots of data to show images, sounds, and text formatted in various fonts, you should use it with either a dedicated

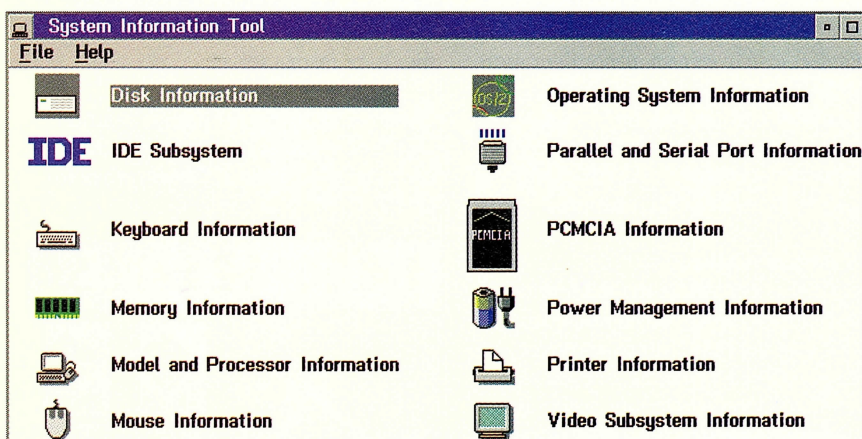


Figure 8: OS/2 Warp's System Information Tool tells you details about the hardware and software installed on your OS/2 PC. It's handy if you need to provide info to vendor tech-support staff.

Internet connection through your LAN, or with a fast modem (14.4kbs or faster). If you use a slower modem, you'll be frustrated as you wait, and wait, and wait. The current beta version is slow even with a fast modem. According to IBM's programmers, the finished WebExplorer will be heavily multi-threaded, which might make it one of the fastest web browsers on the market.

The remaining packages, Telnet, 3270 Telnet, and ftp, are pretty standard fare for Internet fans. Telnet and 3270 Telnet let you log into remote computers, either using UNIX or IBM 3270 terminal emulation. Ftp lets you transfer files to and from your PC over the Internet using the standard UNIX file-transfer protocol. The only OS/2-specific feature of these tools is that they include templates. That feature is pretty handy: If you frequently access a specific ftp site, simply tear off an ftp template and customize it for that site.

The foundation upon which all of these programs rest is the TCP/IP stack included with the Internet Access Kit. TCP/IP makes your PC think that an

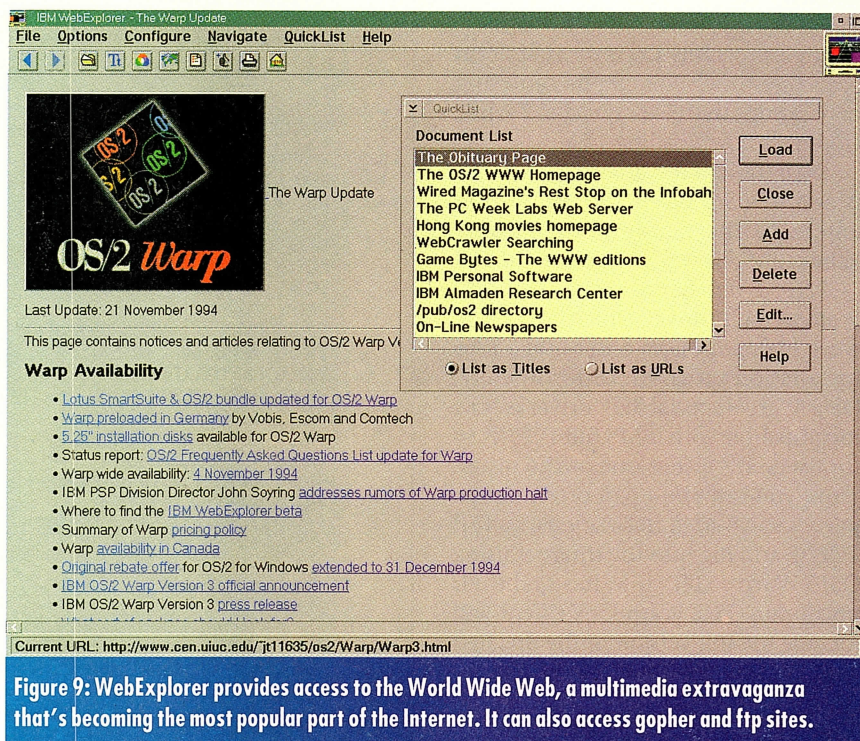


Figure 9: WebExplorer provides access to the World Wide Web, a multimedia extravaganza that's becoming the most popular part of the Internet. It can also access gopher and ftp sites.

Internet connection is a local-area network connection, despite the fact that

you're using a modem instead of a faster direct network connection. TCP/IP lets

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multiple programs access the Internet at the same time: You can be browsing newsgroups with NewsReader/2 while Gopher is downloading a file.

Even though the Internet Access Kit is new in OS/2 Warp, the connection engine has been around for a while. What IBM did was customize the full TCP/IP 2.0's Serial Line Internet Protocol (SLIP) driver, which lets TCP/IP work over a modem and build a new installation program. Unfortunately, OS/2 Warp's special SLIP driver is now incompatible with IBM's full TCP/IP, so for users, it's either one or the other. Thus, you can't be a part of your company's local-area network using full TCP/IP and log into the Internet using OS/2 Warp's SLIP. IBM has said their upcoming OS/2 Warp LAN Client will include the full version of the updated TCP/IP with all of its drivers, and won't use the limited SLIP driver in the current OS/2 Warp BonusPak.

Another weak point: SLIP isn't the newest TCP/IP modem protocol, or even the best. The newer Point to Point Protocol (PPP), is widely believed to be the way of the future, and many up-and-coming Internet service providers only offer PPP connections. (Other

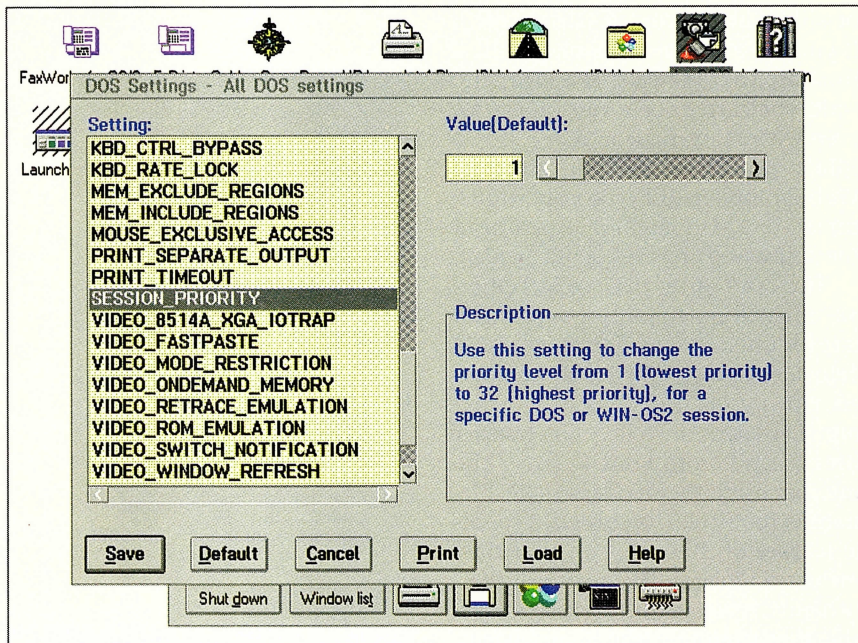


Figure 11: Just as in OS/2 2.x, you can call up Settings notebooks and customize various options to make DOS, Windows, and OS/2 programs run the way you want.

providers, such as IBM's Advantis, offer SLIP compatibility.) IBM hasn't announced a PPP version of the Internet Access Kit, but since the Account Setup dialog box contains a

ghosted "PPP" button, we can guess that they're working on it.

While all of the tools and utilities we've just looked at are separate programs, they converge when talking to the Internet. To hook up, simply click on any of the tools and, if you're not currently connected, a dialog box pops up asking which Internet access provider you wish to use. (If an Internet connection is already active, the tool simply starts working.)

If you select "IBM" as your network provider, OS/2 Warp loads the bundled Advantis network drivers (Advantis is a joint venture between IBM and Sears, Roebuck). If you're not currently an Advantis subscriber, you can sign up right away, as long as you have your credit-card number handy. OS/2 Warp 3.0 includes three free hours on the Advantis network, but if you don't cancel your account after either three hours or 30 days, a one-time hook up fee of \$35 is billed to your credit card, and your first month's payment of \$12.95 is added. Additional fees accrue for each hour you're connected to Advantis. All these rates are much higher outside the United States.

You don't need to use Advantis as your Internet provider, but IBM doesn't go out of its way to tell you so. You can

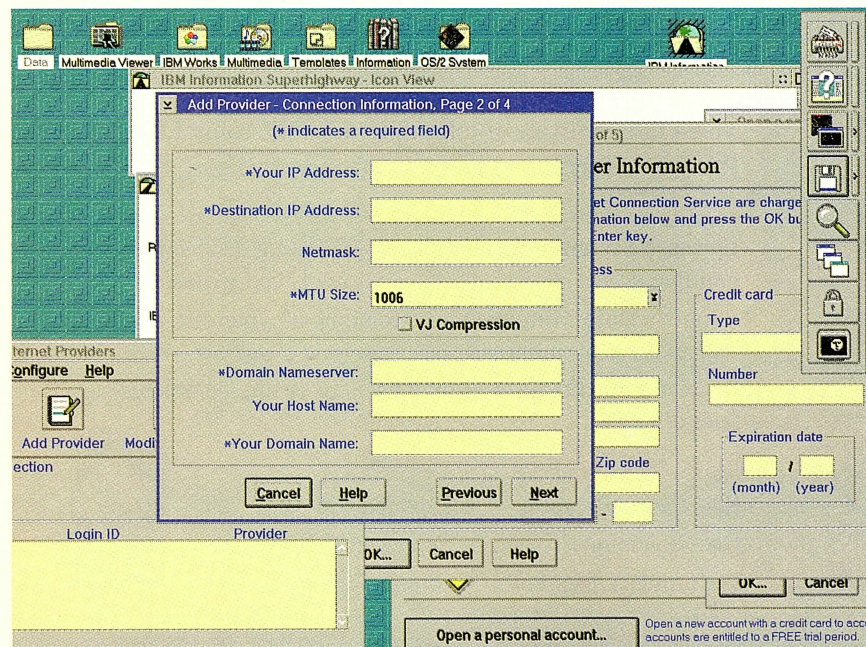


Figure 10: As long as you have a modem and valid credit card, you can immediately sign up with IBM's Advantis service provider. If you want to use a different provider, the process is more complex.

use any Internet service provider that supports SLIP-type connections. It's more work to find one that's less expensive and has local telephone access numbers—but they're out there. To use an independent provider, you'll need to provide OS/2 Warp with a number of technical specifications from the provider. The best thing to do is to enter them into the computer with your provider's customer-service rep on the phone.

When it's time to connect to one of those alternative providers, OS/2 Warp's software doesn't make it easy. You'll need to manually pick which account to use every time you connect, even if only one account is available. A nickname field, which is mandatory, is provided to identify each provider/user setup combination (even though the provider and user's name are visible from the Options dialog box). If you enter the same name in the nickname field, your old entry will be overwritten without warning. Also, be sure that your Internet provider assigns you a

specific destination ip (Internet Protocol) address: Some providers assign addresses on-the-fly as you log on, and OS/2's dialer software won't work without a permanent ip address.

IBM is continuing to debug and update the software included in the Internet Access Kit. IBM shipped us version 1.06 of the access software for this review, but we found a later release to test, version 1.11. While the Advantis dialer automatically updates the Internet Access Kit's core software upon connection, one of the bugs in 1.06 is that, on some modems, communications will hang after one minute—which isn't long enough to download the fix.

If you have this problem, you'll need to find a later version of the file *install.exe*, store it in your `\tcp\tmp` directory, and execute it. If you have access to the Internet through a source other than OS/2 Warp, ftp to `ftp01.ny.us.ibm.net` (ip address 165.87.194.246); you'll find *install.exe* in the `/pub/Advantis/OS2_Client/` directory.

If you don't have Internet access, you can download the file from IBM's BBS at (919) 517-0001. To login, use first name *iak*, last name *support*, and password *iak5138*; you'll find the file in the corrective-service software directory. If you're not on-line at all, call (800) 237-5511 or your local OS/2 technical support number.

The Internet Access Kit is a real coup for OS/2 Warp. Despite the bugs, the value of having a real SLIP connection to use in conjunction with a set of top-notch tools, such as The WebExplorer and UltiMail Lite, makes OS/2 Warp 3.0 a great choice for people who want to access the Internet from their home or non-Internet-connected office—Alexander Antoniadis, Assistant Editor.

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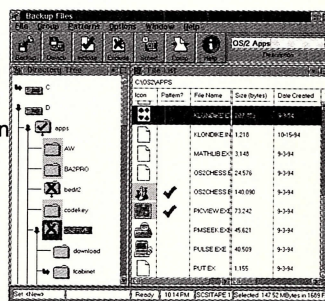
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Practicing Safe REXX

Will they still respect your code in the morning? by Shmuel (Seymour J.) Metz

REXX, the programming language included in every box of OS/2, is one of the few things that's stayed pretty much the same between OS/2 2.x and OS/2 Warp 3. If you've never explored REXX's capabilities as a programming tool, and as a powerful macro language, the benefits are numerous.

If you have used REXX occasionally, or are just beginning to learn the language, this article is for you. Our goal is to help you avoid common, and often hard-to-debug, REXX problems. Although REXX is, in many ways, a good language, it has some pitfalls. An understanding of these pitfalls and of some easy ways to handle them will make your experience with REXX, as included with OS/2, more enjoyable.

What is REXX?

REXX is a language that was originally designed to replace the EXEC and EXEC2 command-macro languages in the Conversational Monitoring System (CMS) component of IBM's Virtual Machine/System Product (VM/SP) mainframe operating system. (If you're not a mainframe expert, feel free to ignore this jargon.)

For more than 10 years, REXX has been spreading to a large number of other platforms, including UNIX, and has been designated by IBM as the SAA procedures language, that is, a language designed to be common across most or all computer platforms. REXX has been used to implement a wide variety of applications beyond its original problem domain, including many of substantial size.

Pitfalls for the unwary

REXX has a number of features that can trap the novice. This does not mean that REXX is a bad language, just that you need to understand it for what it is, as you must for any other programming language. Some of these features are just language glitches while, in other cases, they were added as the necessary price for greater expressive power.

One of the easiest ways to run afoul of REXX is to be misled by superficial similarity with other languages, especially PL/I, TSO CLISTs, and languages derived from them. I recommend you make a conscious effort to learn REXX on its own

terms, without relying on analogies with other languages.

Other areas that may confuse the neophyte are the use of abutment for concatenation, the use of uninitialized variables as constants, the rules for continuation, parsing, the block structure, and the way variable references are passed. (We'll go into more detail in the next section.)

You may write REXX code that must run on multiple platforms, or in different environments on the same platform. REXX has some language features that may impede portability. It also has some features that can be exploited to improve portability. I will give some guidelines on how to ease migration between environments and between platforms. Of course, many generic principles of defensive programming apply just as much to REXX as to any other language:

- Use meaningful variable names.
- Use judicious comments.
- Use a consistent indentation style.

Although I will be discussing only issues and solutions specific to REXX, those generic principles are of equal importance in avoiding programming errors. Let's take a look at a few of REXX's pitfalls that are ready to snare the unwary fast-prototyping programmer:

Abutment

Although REXX has a conventional concatenation operator (||), it also supports two other concatenation operators: abutment with white space and abutment without white space, as shown in Listing 1.

With abutment, an expression abuts a second expression. If there is white space (such as blanks or tabs) between the two, the resulting value is formed by concatenating a *single* blank between the other two values. Otherwise, the result is formed by simple concatenation. It is a common beginner's error to add or remove a blank that appears to be irrelevant to the program's semantics, only to change the output.

Another common error is to abut a literal string with a one-character variable name. If the variable name is a valid suffix for a literal string, such as X for hexadecimal, it will be treated as part of the literal string, not as a variable reference.

Listing 1: Concatenation operators.

```
/* Explicit (conventional) concatenation */
dog = "Peke"
say "Tom's " || dog || "s"      /* output is "Tom's Pokes" */

/* Abutment */
dog = "Peke"
say "Dick's "dog"s"            /* output is "Dick's Pokes" */

/* Abutment with white space */
dog = "Peke"
say "Harry's" dog "s"         /* output is "Harry's Peke s" */

/* Incorrect abutment of X */

x = 'unknown'
say 'C1'X                      /* Will display EBCDIC "A",
                               not "C1unknown" */
```

Listing 2: Continuation after argument separator.

```
say value('X',, 'OS2ENVIRONMENT') /* retrieves X with no side
                                   effects */

say value('X',,
          'OS2ENVIRONMENT')        /* same as above */

say value('X',,
          'OS2ENVIRONMENT')        /* displays current value
                                   of X and then sets X to
                                   OS2ENVIRONMENT */
```

For this reason, among others, it is best not to use single-character names for your variables.

It is so easy to misuse abutment that some recommend that you not use it at all. I consider that position to be extreme, since abutment is so convenient and readable, but you should exercise caution and good judgment in its use.

Continuation

REXX allows implicit continuation; a statement is treated as continued if it would otherwise be syntactically invalid. You indicate explicit continuation with a trailing comma. This approach presents two problems.

If you break a procedure invocation after a comma, the trailing comma will be treated as an explicit continuation request rather than as an argument separator. In this situation, you *must* add an additional comma as an explicit continuation request to allow the sepa-

rator to be recognized, as shown in Listing 2.

If you break an expression after a literal or variable that is not enclosed in parentheses, the statement will be treated as complete and the next line will be treated as a new statement. In this situation, you *must* supply a trailing comma as a continuation request, as shown in Listing 3.

Although, in some cases, REXX will recognize a syntax error when you omit a required explicit continuation character, in other cases, you will get incorrect results with no error message.

Keywords

Avoid the use of variables with the same name as a REXX keyword. If you use such names, you risk having statements misinterpreted or rejected as invalid, as shown in Listing 4. This problem is similar to the misinterpretation of one-character variable names when they are abutted to literal strings.

Labels and SIGNAL

The **SIGNAL** statement in REXX looks very much like a **GOTO** in PL/I and other block-structured languages, but its semantics are very different. Do not attempt to use **SIGNAL** as a substitute **GOTO** or you will cause yourself serious difficulties. Although the form **SIGNAL** <labelname> will cause a jump to the code with that label, it also flushes the control stack. A subsequent **END** statement will be detected as an error, as shown in Listing 5. It is best to use **SIGNAL** strictly for its intended purpose of indicating exceptional conditions.

Parsing

The parsing facilities of REXX have several features that may be confusing to the neophyte. REXX has keywords for abbreviated forms of **PARSE** (for example, **ARG** is short for **PARSE UPPER ARG**). Beginners often forget that these abbreviated forms will translate all data to upper case.

When using **PARSE** or its abbreviations, it is important that you remember that the last variable or period (".") is treated differently from all of the others. In general, its value will include leading *and* trailing blanks. Use the **STRIP** function or a trailing period to remove them if they are unwanted.

Scoping rules

Superficially, REXX appears to be a block-structured language, but it is actually a hybrid between dynamic and static scoping. It is possible, although bad form, to call a label inside a **DO** from code outside the **DO**. It is possible to perform code at an arbitrary label as both a call and a function invocation. It is incumbent upon the programmer to supply the discipline that the language omits. The scope of a procedure is determined dynamically. No static terminator, such as **END**, is available.

Do not write code intended to serve as both in-line and out-of-line code. Programs in which you both call and fall through into the same code are notoriously error prone. Precede each internal subprocedure with a statement, such as **EXIT**, that will prevent you from accidentally falling into it. If your logic permits, begin the procedure with a **PROCEDURE** statement, which must be the first statement after the label, as shown in Listing 6.

The **PROCEDURE** statement hides

all variables except those explicitly listed in an **EXPOSE** clause. If your subroutine accesses the caller's variables and constructs those variable names from its arguments, then you must not use the **PROCEDURE** statement. This is the only situation in which you should omit it (also shown in Listing 6).

It is possible to write a procedure with overlapping scopes, in which one scope hides variables with a **PROCEDURE** statement and the other scope leaves all variables exposed by default (see Listing 6.) This practice is dangerous and should be unconditionally avoided.

Type and range checking

Unlike most other languages, REXX has neither variable typing nor arrays. Arrays are often simulated using compound variables, which can lead to several possible types of undetected errors.

When you assign a value to a variable, nothing checks that the value is consistent with the intended type. If your logic requires any constraints on the values that can be assigned, it is your responsibility to code explicit checks using, for example, the **DATATYPE** function.

When you use a variable name as part of a compound variable to simulate an access to an array element, REXX does not check that the index is within the array extents, or even that it is an integer. If your logic requires enforcing such constraints, you must code them explicitly. Even an uninitialized variable can be used as an "index" for a compound variable.

Uninitialized variables used as constants

When you refer to an uninitialized variable, its value is, by default, its name in upper case. The use of uninitialized variables is frequently a convenient alternative in the use of literal strings. However, if you inadvertently use that name for a true variable elsewhere in the program, you may get incorrect and apparently inexplicable results. It is best to adopt conventions for your variable names that minimize the risk of such problems.

Some programmers recommend always using explicit literal strings for constants. Although well meant, this advice can lead to programs that are harder to read. I recommend that you use uninitialized variables judiciously.

Listing 3: Continuation after expression.

```
'ECHO' 'DIR'                                /* displays 'DIR' */
'ECHO'                                     ,
'DIR'                                     /* same as above */
'ECHO'
'DIR'                                     /* displays directory */
```

Listing 4: Misinterpreted keyword.

```
text = 'tom dick harry'
with = 'Ada Emmy Gracie Lise'
/* we want to parse 'tom dick harry Ada Emmy Gracie Lise'
   with 'with first rest' */
parse value text with first rest           /* wrong ! */
parse value text with with first rest      /* also wrong ! */
```

Listing 5: SIGNAL errors.

```
do forever
  signal BELL
  whatever
BELL:
  end                                     /* an error will be detected here
                                     because the SIGNAL logically
                                     terminated the DO */
```

Variable references

REXX does not currently allow passing parameters to procedures by name or by reference. However, you can often get similar results by passing constants and using them to construct names. This technique is extremely common and powerful, especially in conjunction with compound variables. However, a few things must be kept in mind.

If you call a procedure that has an **EXPOSE** clause on the **PROCEDURE** statement, it will only have access to the variables that you exposed. If you pass an argument containing the name of some other variable, the code will only be able to access a local version of that variable.

If you call a procedure that requires a variable name as a parameter, and use an uninitialized variable to represent its own name for that parameter, you will probably get incorrect results on your second time through.

Interoperability

REXX has some specific features that

you can exploit to make your programs more compatible across platforms, or between environments on the same platforms. REXX also has some features that hinder compatibility. Let's take a look at some of these features.

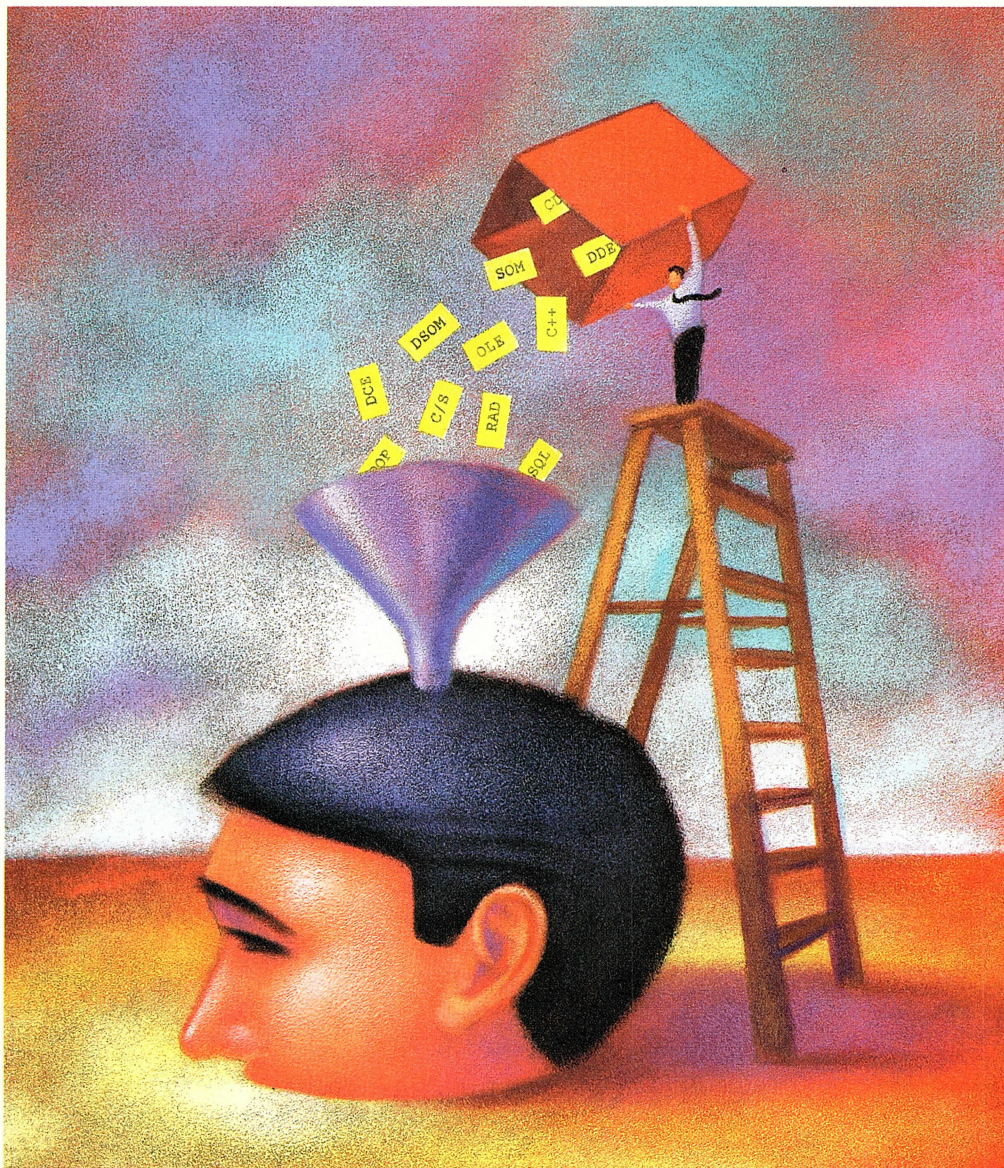
ADDRESS and the default environment

If you write a command file that issues OS/2 commands, do not assume that the default environment is OS/2. By including **ADDRESS OS2** in your code, you will enable the routine for use from within other environments, such as editors that use REXX as their macro language.

Environmental factors

REXX does not shield you from the underlying environment. In writing a REXX program, you must understand the behavior of your operating system and user interface if you want to avoid nasty surprises. As an example, if you invoke a REXX program in an OS/2 *.cmd* file and scan the argument looking for the string *"Q"*, you will not

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Listing 6: Procedure isolation.

```
saytime: PROCEDURE                                /* here I can get away
                                                    with hiding all variables */

    say time
    return
/* Note that there is no END statement ! */

exit                                              /* In case of
fallthrough, since I
can't use PROCEDURE */

putdata:
    parse arg name .
    say name '=' value(name)
    return
/* Note that there is no END statement ! */

badstyle: PROCEDURE                             /* This entry has no access */
badform:                                         /* This entry has access*/
...
return
/* Don't ever do this; it is an extremely dangerous style */
```

Listing 7: LINES examples.

```
/* In standard REXX */
do lines(myfile)
    myline=linein(myfile)
    ...
end
/* In OS/2 this would only read one line ! */

/* In OS/2 SAA REXX */
do while lines(myfile) /= 0
    myline=linein(myfile)
    ...
end
```

find it because *cmd.exe* will have taken the string “/Q” to be a “quiet” option and removed it.

If you must use binary or hexadecimal constants for character data, be aware that character encoding varies among systems. Although OS/2 uses ASCII, some other systems use EBCDIC. Further, even under OS/2, the correct value may depend on the code page that is in use. Be aware of the character sets used in each of your target systems, and program accordingly. Segregate system-dependent values and code page-dependent values to make your code easier to maintain.

I/O model

Generic REXX's I/O model is based on the line-number-based file system in the CMS component of IBM's VM/SP. Most other operating systems, like OS/2, do not have an orientation towards line numbers. For this reason, SAA REXX in OS/2 differs from the REXX standard in that the **LINES** function only returns values of zero and one, as shown in Listing 7. Code written in accordance with the standard may fail in OS/2. Further, a faithful implementation could be horribly inefficient if the file system in the host operating system does not maintain

line counts.

REXX does not provide a good way to detect the end of a file. You could use **STREAM(file,"State")** and check for a value of **NOTREADY** but you have no guarantee that **end-of-file** is the only condition causing **NOTREADY**.

The safest method is to encapsulate your input/output code, then take advantage of whatever facilities exist in each target system (for example, **EXECIO** with the **STEM** option and **REXX-LIB** from Quercus). Any such code should be thoroughly documented.

PARSE SOURCE and VERSION

The **PARSE SOURCE** statement allows your code to determine the operating system and file from which it was invoked, as well as the type of invocation. You can take advantage of this statement to maintain a single version of a REXX program for two different systems, to detect inappropriate invocations, select character encoding, and so on. If you have data files that, by default, should be in the same directory as your code, you can use this statement to locate them, as shown in Listing 8.

The **PARSE VERSION** statement allows you to determine the language level of REXX that your program has available. It allows you to write code that exploits new features of REXX, while including alternate code that will be used when running on an older platform (see Listing 8).

REXXUTIL and emergency boot disks

If you might want to use your REXX code from an emergency boot disk, include code that does not depend on **REXXUTIL**, as shown in Listing 9. PM is too large to include on an emergency 1.44 MB floppy, and **REXXUTIL** requires PM.

Variable patterns

If you use variable patterns in the templates of your **PARSE** statements, be aware that some older implementations of REXX do not support all forms (for example, in MVS/XA, the form **+(variable)** is not available). If you need to run on multiple platforms, check which forms are supported on each and program accordingly.

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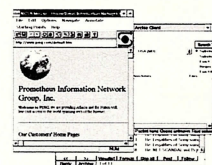
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Listing 8: Parse examples.

```
parse source system invocation origin
select
  when system = 'OS/2' then do
    ...
  end
  when system = 'TSO' then do
    ...
  end
  otherwise do
    say system 'is not supported by' origin
    exit
  end
end

parse version name level date1 date2 date3 .
select
  when name = 'REXXSAA' then do
    parse var level int '.' frac
    if int > 3 then do
      /* fast code for SAA level 4 goes here */
    end
  else do
    /* slower code for older SAA level goes here */
  end
end
  when name = 'REXX370' then do
    /* Code for CMS or TSO level of REXX goes here */
  end
  otherwise do
    say name 'is an unsupported REXX implementation'
    exit
  end
end
```

Listing 9: Boot-disk examples.

```
if REXXUTIL_loaded then do
  stat=SysFileTree(filespec,'filelist.','FSO')
  do i=1 to filespec.0
    ...
  end
else do
  'DIR' filespec '/F /O > WORK_FILE'
  ...
end
```

Following the rules

You can make your use of REXX more enjoyable and productive by following a few basic rules. Learn REXX on its own terms. Be careful and consistent in

your use of abutment and continuation. Do not use keywords or single letters as variable names. Use **SIGNAL** only for error handling. Do not attempt to use the same lines as both in-line

code and out-of-line code. Place a **PROCEDURE** at the beginning of every subroutine, and carefully analyze which variables to expose, especially if you will be passing the names of variables. Be careful in your use of uninitialized variables. Adopt a clear and consistent programming style. Understand the vagaries of REXX parsing. Try to make your code portable across platforms and usable in multiple environments.

These rules will not, of course, eliminate all errors, but they will certainly eliminate many errors that would otherwise be highly likely. Good luck, and practice Safe REXX!

Shmuel (Seymour J.) Metz is a Senior MVS Systems Programmer at Unisys Corp., in Washington, D.C., supporting a Federal government facility-management contract. He has worked with computers for 34 years, and has been involved in the development of two different operating systems. He has experience in a wide variety of languages and platforms, and has used REXX on four of them. He can be reached at METZSEYQ on NASCOM and as 71054.3066 @compuserve.com on the Internet. Metz has an MA in Mathematics from the University of New York at Buffalo. Copyright 1993 by Shmuel (Seymour J.) Metz. All rights reserved.

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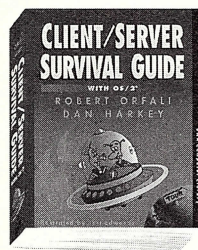
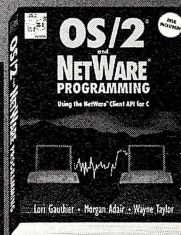
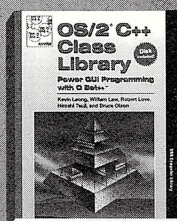
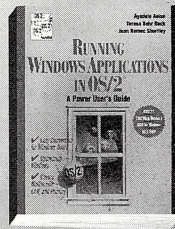
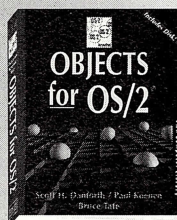
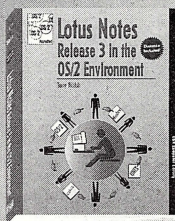
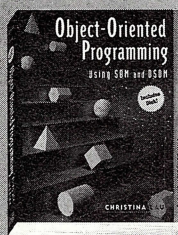
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NG PRODUCTS FOR OS/2 BY BILL SCHINDLER

When OS/2 users get together, system performance is one of the topics that seems to inevitably come up. In any group of more than five OS/2 users, you'll hear someone bragging about how fast OS/2 runs on their system, and someone else bemoaning the poor performance they're getting. It isn't too long before you begin to hear advice on how to tune OS/2. The problem is that one person's advice will often conflict with another's.

Your computer hardware, in combination with OS/2, has become a system. Each card, the motherboard, the RAM, the hard drive, and the various drivers and software, all interact. These interactions affect system performance. You can often improve the performance of an OS/2 system by following some general "rules of thumb," but those rules seldom result in an optimal setup for your system.

To get the best performance, you must monitor how your system runs under a normal work load. You then use that information to modify system settings to improve performance. Without some performance-monitoring information to provide an objective measure, you can only guess at what

In any group of more than five OS/2 users, you'll hear someone bragging about how fast OS/2 runs on their system, and someone else bemoaning the poor performance they're getting.

needs to be changed, or whether a change had any effect on system performance.

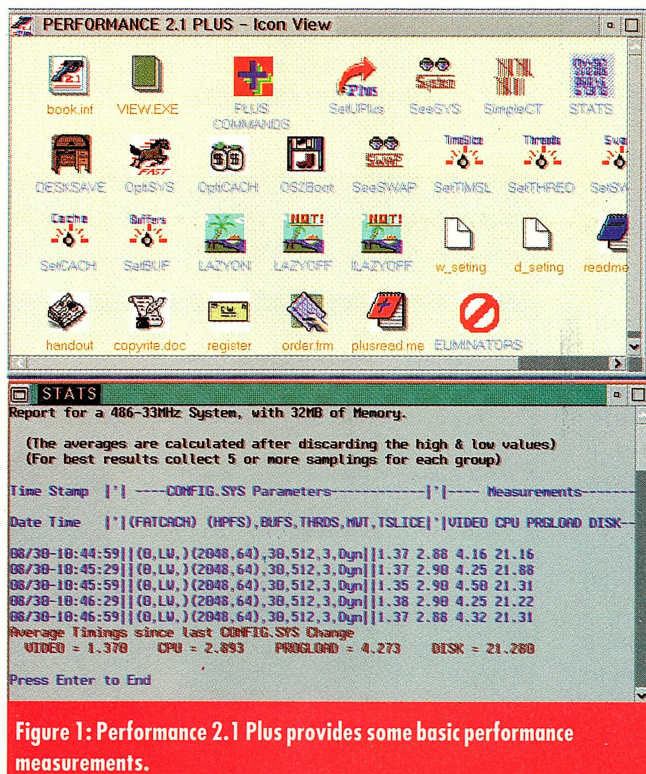
Performance-monitoring tools allow you to collect the information you need to determine what you need to modify, and whether a modification had a positive or negative effect. Let's evaluate four products that promise to help you monitor—and perhaps improve—your system performance.

The performance-monitoring products were run on three systems: a 25MHz 386SX with 8MB RAM and two 40MB IDE hard drives; a 33MHz 486DX with 16MB RAM and a 310MB IDE hard drive; a 33MHz 486DX EISA bus system with 32MB of RAM and a 1GB SCSI hard drive.

Performance 2.1 Plus

Performance 2.1 Plus is the poor man's system-performance tool. It doesn't create fancy graphs, and it doesn't continuously monitor CPU, memory, and disk-cache usage. What it provides is a simple tool to test the overall performance of your OS/2 system, and a set of programs that can help you in your effort to tune your system's performance.

During setup, you tell Performance 2.1 Plus some information about



Review

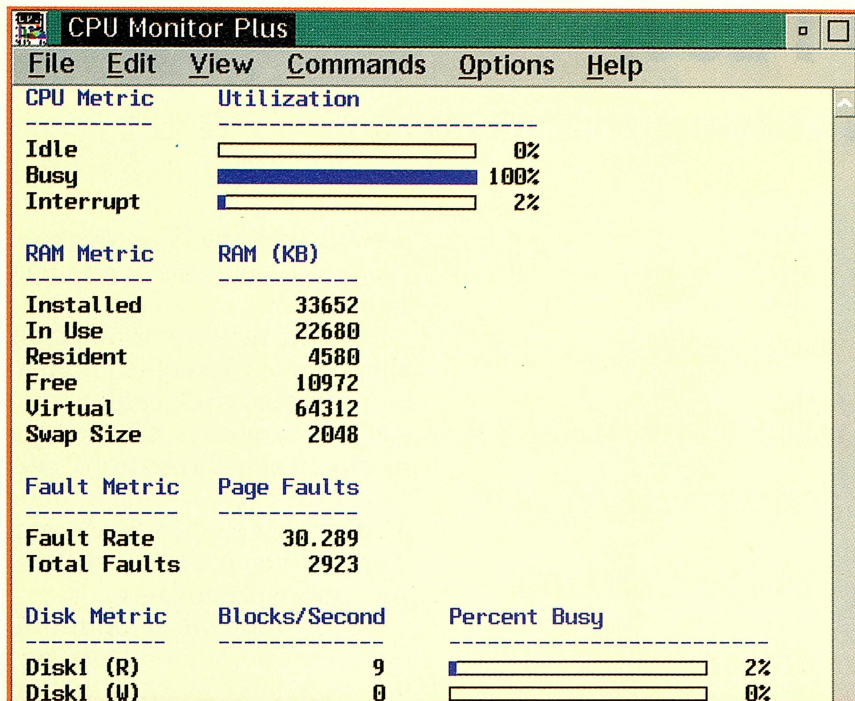


Figure 2: CPU Monitor Plus uses bar graphs and numbers to show the current system load.

your system—the type of processor, the processor's speed in megahertz, and how many megabytes of RAM your system contains. You're given the option of updating *config.sys* to add Performance 2.1 to the path.

You use the SimpleCT program to collect some basic statistics (video, CPU, program load, and disk) on system performance. You can view the statistics and their averages using the STATS program. Once you've collected statistics, you can change a system setting, then collect the statistics again. If the timings improve, you know you're moving in the right direction. If the timings get worse, you know that the setting needs to go back to its original value.

Performance 2.1 Plus contains a couple of programs that attempt to set values in *config.sys* to "optimal" values based on your system's

processor, processor speed, and RAM. The problem is that these values are an average of what worked well on other systems with the

same general configuration. They may improve the performance of your system, but the suggested values actually degraded the performance of one of my test systems.

Performance 2.1 includes many other utilities that can help you work smarter and safer. Some of the utilities include an image backup of the OS/2 desktop, space used by a directory structure, and several utilities that remove unwanted files.

The Performance 2.1 manual provides a good explanation of various tuning options. If you've never done any performance tuning and you don't know what all that stuff in *config.sys* means, the manual will give you a good introduction.

CPU Monitor Plus

Bon Ami's CPU Monitor Plus installs by loading two device drivers in *config.sys*. After you reboot your system, you can monitor CPU, memory, and disk utilization on a per-process and per-thread basis.

CPU Monitor Plus displays real-

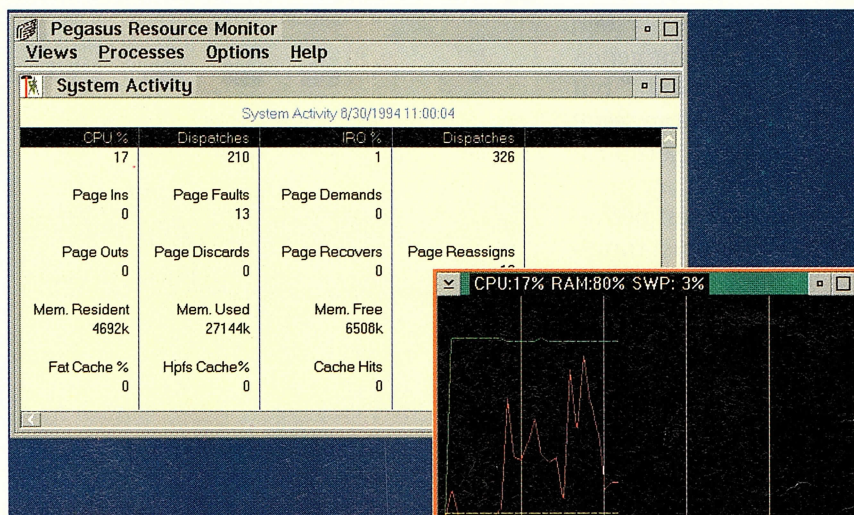


Figure 3: Pegasus shows system utilization as both numbers and moving line graphs.

time information as bar graphs and numbers within the main window. When its logging function is turned on, CPU Monitor Plus captures the information you see in the window to a file. Since the data is formatted in the file in exactly the same format you see on the screen, and a screen of information is captured at each interval, the log file can quickly become very big. You can control the logging interval, but even at its maximum of once every minute, I found that the log file often grew to a size that I was unwilling to print.

Other than the formatted log file, CPU Monitor Plus doesn't offer any reporting tools. If you want to summarize the collected data, you'll have to write your own program to analyze the log file and produce a report. The information displayed (and logged) can be in any of several predefined formats, or you can set up your own custom formats. The manual is good, but the parts on performance tuning could use some more depth.

Pegasus

The first notable difference with Pegasus is that it installs without changing anything in your system. You don't need to make changes to *config.sys*, install drivers, or copy anything into your OS/2 directories. You simply install Pegasus in its own directory and run it.

Pegasus starts up with a standard PM window, and a second window that uses three lines to graph CPU, RAM, and swap-file use. Additional information can be displayed in child windows within the main window. Other information includes system activity, I/O activity, application activity, real-time activity, and (if Theseus/2 is

installed) per-process memory.

Pegasus logs performance data to a binary file. A REXX interface is supplied, and several predefined REXX programs produce a variety of reports from the logged data. If one of the predefined reports doesn't fit your needs, you can easily modify one of the supplied REXX programs to produce the report you desire. The on-line help does an excellent job of explaining the data displayed on screen.

System Performance Monitor/2

IBM's SPM/2 includes several parts. One part, Theseus/2, is recognized and used by Pegasus. IBM advertises SPM/2 primarily as a network performance-monitoring tool, however I found it more than capable for monitoring a single machine. Because of SPM/2's networking orientation, it asks for workstation names as part of its initial configuration.

Installation is simple, but several changes must be made to *config.sys*. The Theseus/2 driver is installed, an environment variable is added, and entries are added to **LIBPATH**, **PATH**, and **DPATH**. You must reboot your system before SPM/2 can run.

SPM/2 displays three separate utilization graphs, one for the CPU, one for disk activity, and one for RAM. The RAM graph tracks five different values. SPM/2 can log and graph information.

Theseus/2 supplies an almost overwhelming amount of information about system memory usage, right down to the thread level. You can use Theseus/2 to snoop through every byte of memory in your system. Theseus/2 can analyze the memory usage on your

system over a period of time, and create a report that shows the recommended amount of memory your system should have. It can also trap and show memory leakage problems, which is a real boon to anyone involved in software development.

SPM/2 generates a variety of reports from the information stored in a log file. Reports can summarize logged information by workstation, application, process, or thread. Reports can be generated to a file, a printer, or in spreadsheet format in case you want to do further analysis.

The on-line documentation and help is extensive. The context-sensitive help explains the information displayed, and often offers system-tuning suggestions. The on-line documentation is thorough, though you may find the going a bit rough if you're not familiar with OS/2 system-level terminology.

Conclusion

Performance 2.1's modifications provided an excellent starting point for further performance tuning on two of the three systems tested. Even if you need a high-end performance-monitoring tool, I'd recommend getting a copy of Performance 2.1. The additional utilities and the manual included with Performance 2.1 Plus make it a very useful package.

Most OS/2 users only need a simple performance-monitoring tool that will help them tune a single system. Both Pegasus and CPU Monitor Plus are good choices for such general use. To get the most information from Pegasus, you'll need a copy of Theseus/2. The drivers supplied with CPU Monitor Plus give a subset of the data sup-

Review

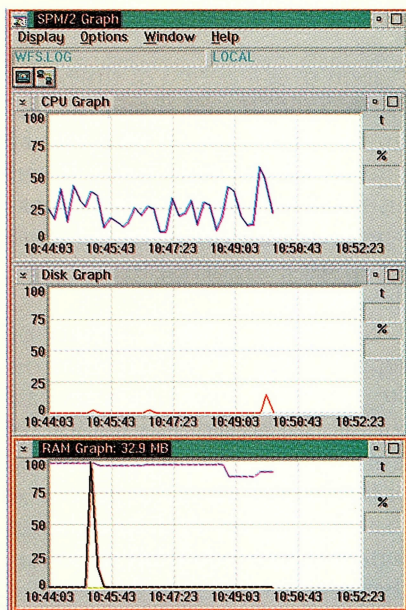


Figure 4: SPM/2 graphs CPU, disk activity, and RAM.

plied by Theseus/2. If you need to monitor several machines over a network, or you need to monitor a lot of in-depth information, SPM/2 is your only choice.

One of the systems that I used as a test bed—the 33MHz 486DX with 16MB of RAM—has never performed well. All three performance-monitoring programs showed me that this 486 actually has lower overall performance than the 25MHz 386SX! After several fruitless modifications, I finally determined that the performance bottleneck was in the machine's motherboard. Without a monitoring program, I would have spent a lot more time trying to determine this machine's problem.

These four performance-monitoring tools vary quite a bit in price and features. In general, you get the amount of detail that you pay for, and all are good values for their price. However, none of them promise to directly improve your system's performance. They are

merely tools for taking a snapshot of the system's current performance. To get the best value possible, you're going to have to rely on your own OS/2 knowledge.

Bill Schindler is a computer consultant specializing in system software and compilers. Before discovering computers, he worked as a plastics mechanic, a black-and-white darkroom technician, and a door-to-door salesman. You can reach him via CompuServe at 74774,1420.

RESOURCES:

CPU Monitor Plus (\$129.95)

BonAmi Software Corp.
60 Thoreau St., Ste. 219
Concord, MA 01742
(508) 371-1997
fax (508) 371-2333

READER SERVICE NO. 154

IBM System Performance Monitor/2 (\$495)

Additional license \$465
Distributed features \$75.
Rome Networking Systems Lab

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00144-Roma, Italy
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Pegasus Resource Monitor (\$99.00)

OnDemand Software & Services
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Naples, FL 33940
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Performance 2.1 Plus (\$39.95)

Clear & Simple Inc.
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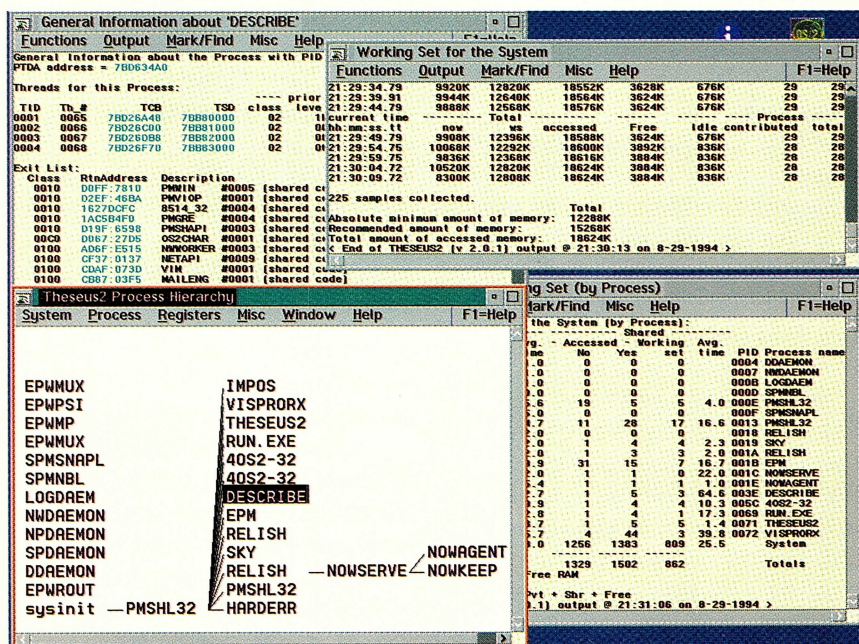


Figure 5: Just a small part of the overwhelming amount of data that Theseus/2 provides.

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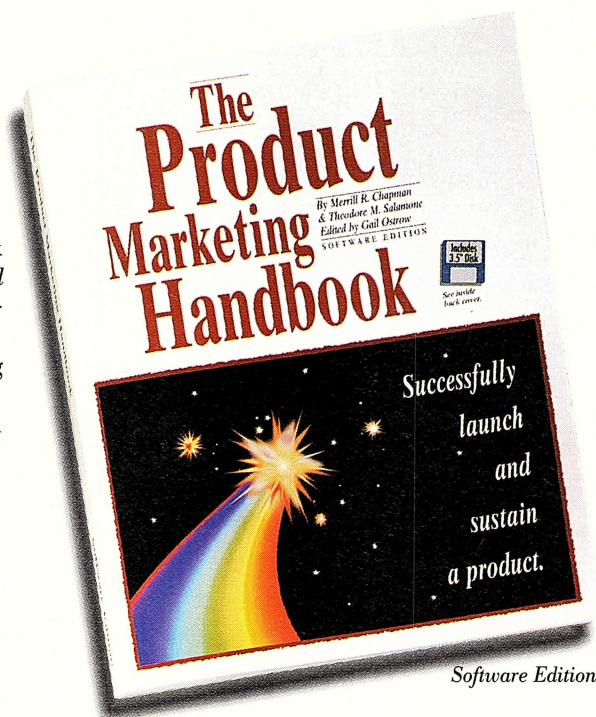
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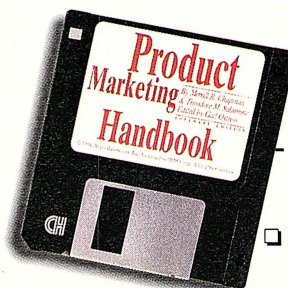
Merrill R. Chapman has been in the software industry for 15 years and has seen firsthand the brilliant marketing techniques employed by industry giants and the catastrophic errors made by companies that are no longer in business. He presently consults with and trains marketing professionals in companies that include IBM, DataEase, SUN, Berlitz and WordPerfect.



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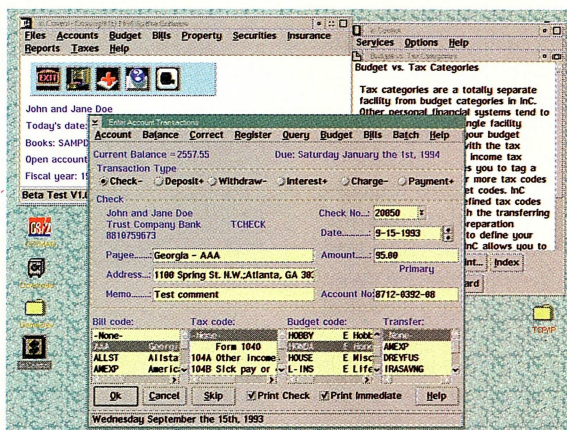
In Control 1.1

Quicken refugees rejoice

Spitfire Software announced the debut of their personal and small-business finance program, In Control. This program can keep multiple sets of books with as many as 17 types of accounts. Other features include a user-defined start date for the beginning of the fiscal year, support for multiple currencies, and six types of account transactions.

Import-export facilities include support for Quicken and .txf format (which is used by TurboTax and Tax Cuts). In Control sells for \$79. Call Spitfire at (404) 257-0187 or fax (404) 255-8032.

READER SERVICE NO. 158



have the uninitiated writing their own REXX programs and macros in three weeks. In addition to the basic structure of REXX, the book covers extensions of REXX in the OS/2 environment. The 550-page book sells for \$29.95. The ISBN number is 0-672-30529-1. Call SAMS Publishing at (800) 428-5331 or (317) 581-3500.

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Microway is announcing a special package of OS/2 compilers that is specially optimized for the Pentium chip. The language choices are Fortran-77 (Fortran-90 is available for \$395 more), Pascal, or C/C++—all of which are 32-bit and have been tuned for Intel's Pentium. The package also includes the IBM OS/2 Toolkit and IBM WorkFrame, which are compatible with all of the compilers. The price of the entire package is \$895. Call Microway at (508) 746-7341 or fax (508) 746-4678.

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Attachmate is announcing the latest version of their OS/2 PC-to-host software, Extral for OS/2. This 32-bit multi-threaded program has been written to exploit Workplace Shell with extensive use of drag-and-drop. The connectivity features include APPN and 3270 engines, which make APPC/CPI-C, LUA, SDLC, DFT, DLC (802.2), IPX/SPX to Novell Netware SAA, and Attachmate Gateways. Call Attachmate at (800) 426-6283, (206) 644-4010, or fax (206) 747-9924.

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their OS/2 tax-planning software, TaxDollars 1994. This Workplace Shell program supports 1040, W2, 2106, 8829, and 2441 tax forms and Schedules A-E, R, and SE. The initial release, the planning edition, which is available for \$19.95, can do most of the calculations, but the final version is necessary to prepare forms. The final version, which costs \$7.50 extra, will be sent to customers once the tax laws are finalized. Call BT&T at (714) 363-7185 or fax (714) 249-8349.

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Teach Yourself REXX in 21 Days Learn REXX fast

SAMS Publishing is releasing a new book that teaches beginners the basics of REXX, Teach Yourself REXX in 21 Days, written by independent consultants Bill and Esther Schindler. This book offers a tutorial that promises to

Hobbes Ready-to-Run CD

Seamless access to Hobbes site

Walnut Creek CD-ROM is announcing an update to their Hobbes disc, which contains uncompressed files. The disc contains objects that are at the Hobbes OS/2 Internet site that weren't as useful in their compressed form on the regular archived edition of Walnut Creek's Hobbes disc. The regular archived edition will still be available for subscription and individual purchases. The Hobbes Ready-to-

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Clearlook 1.1

New OS/2 word processor for OS/2

Clearlook Corp. is announcing the new entry to the OS/2 word-processor marketplace, Clearlook 1.1. This word processor uses component parts to build documents. Features include a single-mode view with sizing from 20 percent to 1,200 percent, multi lingual spellchecking and thesaurus, and a text-transformation feature for mail merges and envelope printing. Clearlook 1.1 retails for \$199. Call Clearlook at (800) 818-5665, (703) 425-1163, or fax (703) 764-3746.

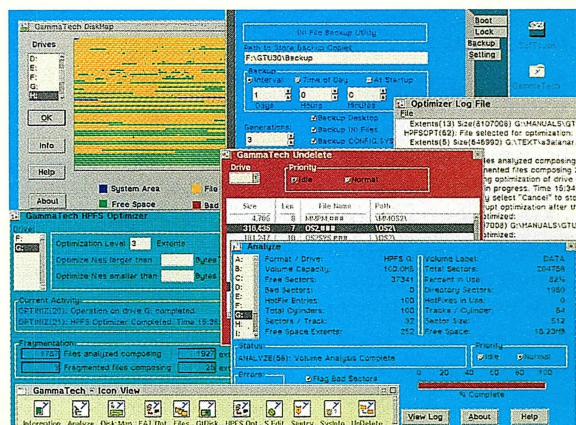
READER SERVICE NO. 164

GammaTech Utilities Version 3

New utility package for Warp

SofTouch Systems is announcing version 3 of the GammaTech Utilities for OS/2. It contains more than 200 enhancements that were not included in the previous release—mostly in the areas of performance and usability. The revamped disk-optimization utility includes a graphical representation of both HPFS and FAT volumes, expanded support for HPFS386, and special support for new revisions of the high-performance file system. Other new utilities include a binary file editor and a system-resource inspector. The new version of the GammaTech Utilities will retail for \$149 (\$299 for a network license), with an introductory price of \$99 (\$199 for a network license) until March 31, 1995. Contact GammaTech at (800) 944-3036, (404) 947-8080, or fax (404) 632-6537.

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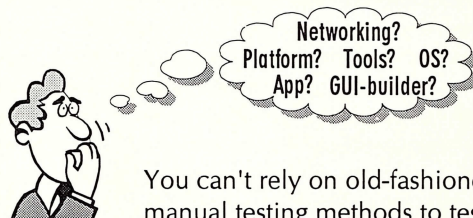
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REXX Galore

NEW EVENTS MIGHT MAKE REXX
MORE WIDELY ACCEPTED IN THE COMMUNITY BY DICK GORAN



For the first time since OS/2 2.1 was released, we have a number of new events occurring in the REXX community that have resulted from new software releases by IBM. OS/2 Warp 3.0 has hit the streets with additional functions in REXXUTIL, Object REXX has finally been released on Volume 6 of *The Developer Connection for OS/2* CD-ROM, and IBM will make REXX generally available for the DOS community with the upcoming PC DOS 7.0.

Warp and REXX

OS/2 Warp has added five new functions to the REXXUTIL application programming interface (or API). Definitions 1 through 5 contain a description of the new functions. Unfortunately, IBM did not do a very good job of documenting them. Copying, moving, or creating shadows of Workplace Shell objects (WPS) is somewhat intuitive, but saving and opening WPS objects with the new functions is not.

SysCopyObject(), **SysMoveObject()**, and **SysCreateShadow()** are fairly straightforward in their purpose. These functions give you a simple method for copying, moving, or creating shadows of WPS objects from within a REXX program. However, some points are of special interest when using these three functions.

When an object is copied, no object ID is provided for in the copy. Whether the original object has an object ID or not, the copy will not have an object ID. The only mechanism for assigning an object ID to the copy is with a third-party utility, such as DeskMan/2.

When a shadow is created, the shadow ID of the newly-created object will have the same value as the object ID of the original object.

Definition 1: SysCopyObject().

SysCopyObject(object_name, object_destination)

This function returns **1** if **object_name** was successfully copied to **object_destination**; otherwise, it returns **0**. If the object already exists in the destination location, it is not copied and a **0** is returned.

Both **object_name** and **object_destination** can be a WPS object ID (the unique string that is preceded by a < and terminated by a >) that is assigned to the object when it is created (for example, <WP_DESKTOP>) or a fully-qualified file name.

Note 01: The copied object will not have an **OBJECTID**, whether the original object was assigned one or not.

Note 02: Some of the object's other properties are not copied with the object. Specifically, **ASSOCTYPE=**, which belongs to the original object, does not appear on the copy, which is consistent with what occurs when using drag and drop to copy an object.

Definition 2: SysCreateShadow().

SysCreateShadow(object_name, object_destination)

This function returns **1** if **object_name** was successfully copied as a shadow to **object_destination**; otherwise, it returns **0**.

Both **object_name** and **object_destination** can be a WPS object ID (the unique string that is preceded by a < and terminated by a >) that is assigned to the object when it is created (for example, <WP_DESKTOP>) or a fully-qualified file name.

Note 01: The shadowed object will have a **SHADOWID** equal to the original object's **OBJECTID**.

Apparently, the purpose of the **SysSaveObject()** function is to force OS/2 to write the *os2.ini* file to disk. I have no idea what particular purpose this function was created for, except possibly as a fail-safe mechanism in case of a system error. I have asked the IBM REXX development group for an explanation of the function, but they have been unable to provide any meaningful information yet.

The **SysOpenObject()** function is just as obscurely documented in the on-line *rexx.inf* file that comes with OS/2 Warp. As with many of the other WPS functions that are contained in REXXUTIL, the IBM-supplied documentation refers to WPS and Program Manager C++ language functions that the average user would not have access to without owning the toolkits made for OS/2. The information shown in

Definition 3: SysMoveObject().

`SysMoveObject( object_name, object_destination )`

This function returns **1** if **object_name** was successfully moved to **object_destination**; otherwise, it returns **0**. If the object already exists in the destination location, it is not moved and a **0** is returned.

Both **object_name** and **object_destination** can be a WPS object ID (the unique string that is preceded by a **<** and terminated by a **>**) that is assigned to the object when it is created (for example, **<WP_DESKTOP>**) or a fully-qualified file name.

Definition 4: SysOpenObject().

`SysOpenObject( object_name, view, flag )`

This function returns **1** if the WPS object **object_name** was successfully opened on the desktop; otherwise, it returns **0**.

Object_name can be a WPS object ID (the unique string that is preceded by a **<** and terminated by a **>**) that is assigned to the object when it is created (for example, **<WP_DESKTOP>**) or a fully-qualified file name.

View specifies the view to be opened and can contain either a numeric value or the equivalent string. The function will pass all numeric values to the underlying **wpOpen()** or **wpViewObject()** function without testing the value for validity.

- 0 - DEFAULT
- 1 - ICON
- 2 - SETTINGS
- 3 - HELP
- 4 - RUNNING
- 5 - PROMPTDLG
- 121 - PALETTE

Flag can contain a **1**, which indicates that an existing view of an object can be opened on top of the Desktop by calling the **wpViewObject** method or a **0**, which indicates that the view specified in **view** is to be opened by using the **wpOpen** method. The following comment originated in the description of the **wpOpen** method.

"In general, **wpViewObject** should be used instead of the **wpOpen** method. This is because **wpViewObject** takes into consideration the setting in the Object Open Behavior field on the Window page of the Settings notebook for the object. If a view of the object is already open, **wpViewObject** will, depending on the setting of the Object Open Behavior field, either display the existing window for the object or create a new object. In contrast, **wpOpen** always opens a new view of the object. Under certain circumstances this might be called for, but, under most circumstances, **wpViewObject** should be called instead."

Definition 4 was compiled from a combination of "bit-digging" research, along with some assistance from IBM's Glendale Laboratories—the group that is responsible for REXX development.

The numeric values that are shown in Definition 4 (and used to tell the function which view is to be opened) may not be complete. It will take some trial-and-error testing as well as

independent research to determine what other values can be used. I suggest that users who want to keep up with the latest information as it becomes available stay current on the material in the various REXX-related forums on CompuServe (OS2DF1, Section 6), IBM's IBMLink and TALKLink (OS2REXX CFORUM), *comp.lang.rexx* on the Internet, and your favorite local BBS.

Development Technologies and Greg Czaja have released version 1.51 of DeskMan/2 with updated REXX functionality, as well as interfacing with the WPS functions for OS/2 Warp. My company, C F S Nevada Inc., has released the third edition of the *REXX Reference Summary Handbook* with the OS/2 Warp additions.

One of the other major changes in OS/2 Warp that is directly related to REXX is the ability to both create and change printer objects (**WPPrinter** class) with the REXXUTIL functions. Fragment 6 contains two examples of possible setup strings that can be used to create printer objects. They were suggested by Georg Haschek of PSM, Austria, on my OS2REXX forum on IBMLink.

Object REXX

After a long-awaited delivery preceded by many "real soon nows," Object REXX was released as part of *The Developer Connection, Volume 6*. While I haven't had a chance to use these enhancements to traditional, or classic REXX (as one IBMer termed it), I have read some reviews that lead me to believe that, while the extended features of Object REXX may be substantial, they are not meant for the faint-at-heart. The idea of a built-in interface to System Object Module (SOM) classes and methods is very exciting. However, the absence of documentation on the Volume 6 CD-ROM with Object REXX relating to the workplace classes and methods indicates that either IBM doesn't think that this product is ready for the big-time or they have intended it for commercial programmers.

To use Object REXX, it is necessary to obtain a copy of the *OS/2 Technical Library*. It is also necessary that the user understand the format of C++ language calls and be able to interpolate what is written for C++ into the format required by Object REXX—not a very pretty way to introduce a "language neutral" facility.

REXX for DOS

I know that this magazine and this column are intended for OS/2 users, but I would be remiss if I didn't mention the availability of REXX as an integral part of DOS 7.0. The DOS documentation

calls it the "language of choice" for DOS users, beginning with 7.0.

Because a certain amount of lead time is necessary when I submit my column, I have only had the opportunity to exercise beta copies of the DOS REXX interpreter. The **PARSE VERSION** instruction returns **REXXSAA** as the language processor, along with a level of 4.0 and a date of July 8, 1992. Yet this REXX interpreter, at least the version I have been testing, does an injustice to the System Application Architecture concept in which IBM states:

"Programs written in REXX according to SAA specifications are portable to all other SAA environments. For example, a REXX program written for the OS/2 environment can be run in a CMS or TSO/E environment, if the program does not use OS/2-specific features."

Unfortunately, this statement is not altogether accurate. As a matter of fact, the DOS REXX interpreter is a long way from being compatible with the OS/2 REXX interpreter. Furthermore, without an external data-queue capability and without the equivalent general system and file functions that are available in OS/2 REXX, DOS REXX will probably serve very little useful purpose for OS/2 REXX programmers until it is improved.

RESOURCES:

DeskMan/2 1.51 (\$79.95)

Development Technologies, Inc.
308 Springwood Rd.
Forest Acres, SC 29206
(803) 790-9230

READER SERVICE NO. 166

REXX Reference Summary Handbook (\$19.95)

by Dick Goran
CFS Nevada, Inc.
953 E. Sahara Ave., Ste. 9B
Las Vegas, NV 89104-3012
(702) 732-9616
Fax: (702) 732-3847

READER SERVICE NO. 167

Developer Connection for OS/2 Volume 6

IBM
(800) 633-8266 (U.S.)
(800) 561-5263 (Canada)

READER SERVICE NO. 168

Dick Goran is the author of the REXX Reference Summary Handbook, an OS/2 Reference. He has been in the computer

industry since 1961 and was in the IBM mainframe systems software development business until 1987. His e-mail address is 71154.2002@compuserve.com.

Definition 5: SysSaveObject().

SysSaveObject(object_name, timing)

This function returns **1** if the WPS object **object_name** was successfully saved to the *os2.ini* file; otherwise, it returns **0**.

Object_name can be a WPS object ID (the unique string that is preceded by a < and terminated by a >) that is assigned to the object when it is created (for example, <WP_DESKTOP>) or a fully-qualified file name.

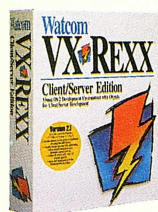
Timing can be **S** (object is to be saved synchronously) or **A** (object is to be saved asynchronously).

Fragment 6: Printer object creation.

```
class      = 'WPPrinter'
title      = 'Test Printer'
location   = '<WP_DESKTOP>'
setup      =,
    'QUEUENAME=MYTEST;',
    'OUTPUTTOFILE=NO;',
    'PORTNAME=LPT2;',
    'PRINTDRIVER=IBMNULL;',
    'DEFAULTVIEW=ICON;',
    'JOBLOGBEFOREPRINT=NO;',
    'QUEUEDRIVER=PMPRINT;',
    'PRINTWHILESPooling=YES;',
    'OBJECTID=<MY_PRINTER>';
call SysCreateObject class,,
                        title,,
                        location,,
                        setup,,
                        'R'
```

```
class      = 'WPPrinter'
title      = 'Test Laser Printer'
location   = '<WP_DESKTOP>'
setup      =,
    'QUEUENAME=MYLASER;',
    'OUTPUTTOFILE=NO;',
    'PORTNAME=LPT3;',
    'PRINTDRIVER='
    'LASERJET.HP LaserJet Series II;';
    'DEFAULTVIEW=ICON;',
    'JOBLOGBEFOREPRINT=NO;',
    'QUEUEDRIVER=PMPRINT;',
    'PRINTWHILESPooling=YES;',
    'OBJECTID=<MY_LASER_PRINTER>';
call SysCreateObject class,,
                        title,,
                        location,,
                        setup,,
                        'R'
```


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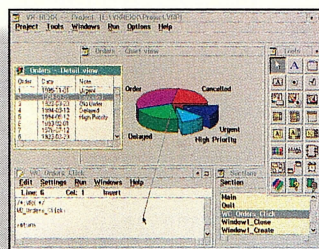
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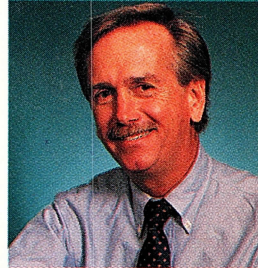
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Reader Service No. 27

Plenty of new OS/2 books to choose from

TITLES RELEASED IN 1994 AND EARLY 1995 BY DICK CONKLIN



New books about OS/2 continue to appear each month, and most of the publishers were quick to jump on the Warp bandwagon. In this month's

column, we've listed all of the new titles that have appeared since one year ago. Thanks to all of the publishers who contributed to this list and especially to Gail Ostrow of IBM's

Independent Vendor League. Gail and the IVL work directly with book publishers and their authors to provide technical and marketing support that helps bring these books to market.

Table 1: OS/2 Books that were published in 1994 or are planned for early 1995.

The following OS/2 books were published last year or are currently on target for an early 1995 release. They are arranged by category: OS/2 Warp 3.0, General and Reference, LAN and Client/Server, General Programming, Languages, and Other Technical. Listings, which appear in order of release date, contain the book's title, the author's name, release date, publisher's name, and ISBN number.

OS/2 Warp 3.0 Books (All Categories: General, Programming, etc.).				
Title	Author	Release date	Publisher	ISBN
Dynamic Data Exchange for OS/2 Programmers	Puchtel	November 1994	Van Nostrand Reinhold	0-442-01949-1
Lotus Notes V3 in the OS/2 Environment	Walsh	November 1994	Van Nostrand Reinhold	0-442-01890-8
OS/2 C++ Class Library:				
Power GUI Programming with C Set++	Law et al.	November 1994	Van Nostrand Reinhold	0-442-01795-2
Running Windows Applications in OS/2: A Power User's Guide	Anise et al.	November 1994	Van Nostrand Reinhold	
Your OS/2 Warp Consultant	Tyson	November 1994	Sams	0-672-30484-8
OS/2 for Dummies (2nd Edition)	Rathbone	December 1994	IDG Books	1-56884-205-8
OS/2 Presentation Manager GPI(2nd Edition)	Winn	December 1994	Van Nostrand Reinhold	0-442-01939-4
The OS/2 Warp Bible	Albrecht and Plura	December 1994	Abacus	1-55755-268-1
The Photo CD Book Abacus (with OS/2 Warp applications disk)	von Bulow and Paulissen	December 1994		1-55755-195-2
Stepping up to OS/2 Warp	Albrecht and Plura	December 1994	Abacus	1-55755-269-X
Developing Multimedia Applications Under OS/2	Lopez	January 1995	Van Nostrand Reinhold	0-442-01929-7
Inside OS/2 Warp	Minasi	January 1995	New Riders	
Mastering OS/2 Warp Version 3	Dyson	January 1995	Sybox	
OS/2 Warp Unleashed	Moskowitz & Kerr	January 1995	Sams	0-672-30545-3
Quick Reference2 Library for OS/2 Functions:				
Vol 3 - Workplace Shell	Scholin	January 1995	Van Nostrand Reinhold	0-442-01899-1
The REXX Cookbook: A Tutorial Guide to REXX for the IBM PC	Callaway	January 1995	Whitestone	0-963-27734-0
Teach Yourself OS/2 Warp Programming in a Week	Thomas	January 1995	Sams	0-672-30684-0
Using OS/2 Warp	Clifford et al.	January 1995	QUE	

Table 1: OS/2 Books (cont'd).

OS/2 Warp Books (All Categories: General, Programming, etc.) cont'd.				
Title	Author	Release date	Publisher	ISBN
OS/2 Warp: Everything You Need to Know	Sosinsky	February	Prima	0-761-50034-0
OS/2 Warp Goldmine	Patton	February 1995	Van Nostrand Reinhold	
Quick Reference Library for OS/2 Functions:				
Vol. 4 - GPI Functions	Scholin	February 1995	Van Nostrand Reinhold	0-442-01900-9
Quick Reference Library for OS/2 Functions:				
Vol. 5 - DOS Functions	Scholin	February 1995	Van Nostrand Reinhold	0-442-01901-7
The Design of OS/2 Second Edition	Kogan, Deitel	March 1995	Addison-Wesley	0-201-52886-X
OS/2 Programmer's Desk Reference	Gopaul	March 1995	Van Nostrand Reinhold	
Programming the OS/2 Warp GPI	Knight and Ryan	March 1995	John Wiley and Sons	0-471-10718-2
The Art of OS/2 Warp C Programming	Panov et al.	April 1995	Wiley-QED	0-471-08633-9
Making OS/2 Work for You: Installing				
Configuring and Using OS/2 Warp	Azzarito and Green	April 1995	Wiley-QED	0-471-06083-6
OS/2 Presentation Manager Mentor	Drapkin	April 1995	Van Nostrand Reinhold	0-442-01989-0
OS/2 Warp Control Program API	Stock	April 1995	Wiley-QED	0-471-03887-3
OS/2 Warp Presentation Manager API	Stock and Barnum	April 1995	Wiley-QED	0-471-03873-3
OS/2 Warp Presentation Manager				
for Power Programmers	Stern and Morrow	April 1995	Wiley-QED	0-471-05839-4
OS/2 Warp Workplace Shell SOM	Stock and Pollack	April 1995	Wiley-QED	0-471-03872-5
Quick Reference Library for OS/2 Functions:				
Vol. 6 - Miscellaneous Functions	Scholin	April 1995	Van Nostrand Reinhold	0-442-01902-5
The OS/2 Warp Workplace Shell Survival Kit	Proffit	May 1995	Addison-Wesley	0-201-40915-1
Secrets of the OS/2 Masters	Sullivan	April 1995	Van Nostrand Reinhold	0-442-01991-2
OS/2 General and Reference Books				
Using OS/2 2.1, Third Edition	Nance	February 1994	Que	1-56529-118-2
OS/2 2.11 Unleashed	Moskowitz, Kerr et al.	April 1994	Sams	0-672-30445-7
OS/2 for Windows Users	Crawford and Russel	April 1994	Sybex	0-7821-1528-4
Introduction to OS/2 Version 2.1	Chambers et al.	May 1994	One Up Corp.	1-884988-00-8
The OS/2 Handbook	Zack	June 1994	Van Nostrand Reinhold	0-442-01234-9
The Complete Idiot's Guide to OS/2	Perry	December 1994	Alpha	
OS/2 Certification Handbook	Hallberg	January 1995	New Riders	
OS/2 for Dummies, Revised for 2.X	Rathbone	January 1995	IDG	
OS/2 for the Impatient		January 1995	Addison-Wesley	
OS/2 Secrets		January 1995	IDG	1-56884-084-5
OS/2 LAN and Client/Server Books				
Client-Server Survival Guide with OS/2	Orfali and Harkey	March 1994	Van Nostrand Reinhold	0-442-01798-7
Introduction to OS/2 - Connectivity	McPeck et al.	May 1994	One Up Corp.	1-884988-02-4
OS/2 Connectivity & Networking	Johnston	June 1994	McGraw-Hill	0-07-032696-7
OS/2 and Netware Programming:				
Using the Netware Client API for C	Gauthier et al.	November 1994	Van Nostrand Reinhold	0-442-01815-0
Connecting with LAN Server 4.0	Nance	February 1995	Ziff-Davis	1-56276-270-2
OS/2 General Programming Books				
Effective Multithreading in OS/2	Dorfman and Neuberger	February 1994	McGraw-Hill	0-07-0017841-0
Cross Platform Programming in OS/2	Dorfman	March 1994	McGraw-Hill	0-07-017862-3
OS/2 2.1 Application Programmer's Guide	Kelly	March 1994	Van Nostrand Reinhold	0-442-01736-7
Introduction to OS/2 - System Object Model	Boudreau et al.	May 1994	One Up Corp.	1-884988-03-2

Table 1: OS/2 Books (cont'd).

OS/2 General Programming Books (cont'd)				
Title	Author	Release date	Publisher	ISBN
Introduction to OS/2 Version Programming	Chambers et al.	May 1994	One Up Corp.	1-884988-01-6
Objects for OS/2	Danforth et al.	June 1994	Van Nostrand Reinhold	0-442-01738-3
OS/2 Presentation Manager Programming	Petzold	June 1994	Ziff-Davis	1-56276-123-4
Quick Reference Library for OS/2 Functions: Vol 1 - Win Functions	Scholin	June 1994	Van Nostrand Reinhold	0-442-01897-5
The Ultimate OS/2 Programmer's Manual	Mueller	June 1994	McGraw-Hill	0-07-043972-9
Quick Reference Library for OS/2 Functions: Vol 2 - Message Functions	Scholin	July 1994	Van Nostrand Reinhold	0-442-01898-3
Object Oriented Programming Using SOM & DSOM	Lau	July 1994	Van Nostrand Reinhold	0-442-01948-3
OS/2 Programmer's Desk Reference	Gopaul	January 1995	McGraw-Hill	0-07-023748-4
OS/2 Language Books (REXX, C++, COBOL, and batch files)				
OS/2 Batch Files to Go	Richardson	January 1994	Windcrest/McGraw-Hill	0-07-052370-3
Developing C/C++ Software in the OS/2 Environment	Gopaul	May 1994	Van Nostrand Reinhold	0-442-01240-3
Writing OS/2 REXX Programs	Richardson	June 1994	McGraw-Hill	0-07-052372-X
Teach Yourself REXX in 21 Days	Schindler and Schindler	September 1994	Sams	0-672-305291
Writing VX-REXX Programs	Richardson	October 1994	McGraw-Hill	0-07-911911-5
REXX Reference Summary Handbook, 2nd Edition	Goran	December 1994	CFS Nevada	0-9639854-2-6
Other OS/2 Technical Books				
OS/2 2.11 Power Techniques	Stegenga	June 1994	QUE	1-56529-286-3
The Ultimate OS/2 File Management Kit	Dorfman and Stegman	July 1994	Windcrest/McGraw-Hill	007-911882-8
Stacker for OS/2 and DOS: Illustrated Tutorial	Heller	December 1994	McGraw-Hill	0-07-027986-1

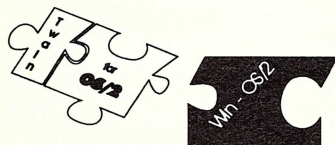
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McGraw-Hill	(800) 262-4729	(614) 759-3641
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Sybex	(800) 227-2346	(510) 523-8233
Van Nostrand Reinhold	(800) 842-3636	(606) 525-6600
John Wiley & Sons	(800) 225-5945	(719) 548-6200
Windcrest/McGraw-Hill	(800) 722-4726	(609) 426-7070
Ziff-Davis Press	(800) 488-8741	(510) 601-2004

Dick Conklin is a contributing editor to OS/2 Magazine and author of three OS/2 books. He can be reached at CompuServe 76711,1005 or Internet os2mag@vnet.ibm.com.

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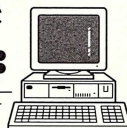
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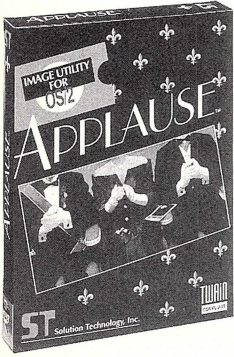
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Reader Service No. 31



Battling with Boot Manager

**MAKING YOUR PC SHARE SYSTEMS IS TRICKY,
BUT NOT IMPOSSIBLE BY MARK MINASI**

In last month's column (January 1995, pp. 62-63), I looked at how the dual-boot feature, which is supported by the *boot.com* program, works and how to retrofit it into a system. This month, let's look at the alternative to dual boot, the OS/2 Boot Manager.

Boot Manager is truly a convenient utility. It lets you install mutually-hostile operating systems onto a single hard disk—and that's a blessing for me. I remember the days when I needed one computer for DOS, another for Concurrent DOS, another for OS/2, and yet another for whichever OS/2 beta was floating around at the time.

Boot Manager takes an 11-year-old idea and makes it work better. Back in 1983, when IBM introduced the XT, they included a larger hard disk than was expected. Most hard-disk retrofits in those days added a 5MB disk to an existing PC system, but the XT included a disk that was double that size—10MB. Why such a large hard disk? Because IBM and Microsoft planned to sell you not only DOS, but XENIX, their version of UNIX. Unfortunately, DOS and XENIX couldn't co-exist on the same hard disk, so IBM and Microsoft created the notion of hard disk *partitions*.

As I described last month, hard disks can be partitioned into smaller areas that each act somewhat like an independent hard disk. The original reason for it was that it allowed PC users to chop up their disks to give one piece to DOS and one piece to XENIX. When running DOS, the XENIX piece would be invisible, and, conversely, when running XENIX, the DOS piece would be invisible. Information on each of

these two partitions was kept in a small "partition" table that was contained in the first sector of the hard disk, the sector designated "cylinder 0, head 0, sector 1," or just "0,0,1"—the Master Boot Record. The PC would know which partition to boot from by examining a bit in the partition table called the "active bit." If the active bit on a partition's record was set to 1, it instructed the Master Boot Record to boot the system from that particular partition.

Under this plan, you could, for example, boot DOS whenever you turned your PC on, but when you wanted to boot XENIX, instead you'd first run the FDISK program and set the XENIX partition to be the "active" partition. (Remember that "active" means "the partition to boot from.") Upon exit, FDISK would force a reboot, starting up XENIX. After you were finished with XENIX, you'd run the XENIX version of FDISK, set the DOS partition to active, and reboot.

The problems with this system were: the invisibility of the inactive partition and the requirement to run FDISK. Then, Boot Manager entered the scene.

Boot Manager works by creating a partition of its own—a small 1MB partition that is set as the active partition. Boot Manager is small, but is the partition that your system should boot from (if you've installed Boot Manager, of course). Once Boot Manager loads, it puts a blue menu on the screen that shows your operating systems choices, allowing you to pick which operating system you'd like to use that day. It'll even default to an operating system if you don't respond within a certain number of seconds.

You must install Boot Manager early on in the OS/2 installation process. To make it work, you've got to have a hard disk with at least 1MB that is unallocated (not part of any partition) so that the Boot Manager can have a home. In addition, you should either have two existing partitions, (one for OS/2 and one for the other OS) or an existing partition with the alternate OS and enough unpartitioned space to create an OS/2 partition.

Next, install OS/2 in the usual manner—but, when it offers you the choice between the "Basic" or "Advanced" installation (I'm now talking about OS/2 Warp 3.0), choose Advanced. Choose to install OS/2 to drive c:, or to specify another drive and choose "Specify other drive." You can't install OS/2 to drive c: if you're also going to use DOS, because, while OS/2 can boot from drive d: without problems, DOS must boot from drive c:. If you try to set up two different partitions—one for DOS and one for OS/2—both of which are named c:—you would drop back into the old DOS/XENIX problem of only being able to see one partition at a time. The DOS partition would be invisible while you ran OS/2, and vice versa for the OS/2 partition while you ran DOS. (By the way, when I say "DOS" here, I mean honest-to-God-real-mode DOS, not the DOS emulator that we run when we use DOS programs under OS/2.)

Telling the OS/2 installation program that you want to specify another partition causes it to fire up a special OS/2 version of FDISK. This version of FDISK lets you create a special OS/2 partition and it will install Boot Manager as well—and that's your next step.

Under the Hood

Once you're inside the OS/2 FDISK, point to any partition and press <Enter>. That action will bring up the FDISK menu. One item on that menu will be "Install Boot Manager...", select it, and FDISK will ask whether to put it at the beginning of your disk's free space or the end. What FDISK is asking is "I've got to create a 1MB partition. Do you want to put it at the front of the disk or the back of the disk?" I put it in the back of the disk, at the end of the disk's free space. I've seen beta versions of operating systems that destroy the Boot Manager partition if it's up front in the free space.

Next, you'll highlight the remaining space and press <Enter>. Choose "Create partition..." and allocate all of its space to OS/2. (If you've already got an OS/2 partition, skip this step.) You'll be asked whether you want to make it a "primary" partition or an "extended logical" partition. It's very important to make this OS/2 partition into an extended logical partition. If you don't, your system will have two primary partitions—the one that the alternate OS (probably DOS) lives on, and the one that you just created for OS/2. DOS can't function that way. As a result, Boot Manager hides the OS/2 partition while you're running DOS. DOS can't boot from an extended logical partition, but OS/2 can, so set the OS/2 partition to extended logical.

Now Boot Manager sees three partitions: its own small partition, the one you just created for OS/2, and the one that existed when you started—which is used by the alternate OS. You'll see two partitions marked "Bootable," the OS/2 and the DOS partition. The Boot Manager partition will be marked "Startable," which means that the system will boot from that partition. The term, "bootable" doesn't mean that you should boot from the OS/2 or DOS partition, it simply means that it's okay for Boot Manager to offer those partitions to boot from—after all, you can't boot from a partition that only contains data.

Next, you must tell Boot Manager which of these partitions to install OS/2 on (the partition that is called the "Installable" partition by Boot Manager). Highlight the partition that OS/2 will go on, press <Enter>, and

choose Set installable from the FDISK menu. FDISK will prompt you to name this partition. I usually take the boring approach, calling it "OS2." Now you'll see that the status of the OS/2 partition has become installable, the DOS partition remains bootable, and the Boot Manager's partition is startable.

Make sure Boot Manager gives you the option of the alternate operating system on its boot menu. Highlight the DOS (or your alternate OS) partition and press <Enter> to get to the FDISK menu. Select "Add to Boot Manager menu...", and press <Enter>. You'll be prompted for a partition name and, again, I'm just boring and use "DOS," "NT," or whatever I've got on that partition.

Now you can press <F3> and exit FDISK. The system will then format the partition, if it hasn't yet been formatted, and your system will install smoothly. You'll get the Boot Manager screen when you boot up, DOS will boot from c:, and OS/2 will boot from d:. If you ever want to change the Boot Manager's settings,

for example, timeout values, partition labels, or the default partition, simply open up an OS/2 prompt and type FDISK.

If you're wondering what would be a good place to use this, I use it to segregate NT and Windows 95 from OS/2 on my system. OS/2 uses some undocumented bytes in its directory structures to keep track of its extended attributes. Windows 95, coincidentally, goes after those very same bytes, causing it to zap OS/2 extended attributes—but that's a story for another day. Putting OS/2 and Windows 95 on different boot partitions minimizes their contact, keeping your systems up, running, and isolated.

Mark Minasi has been a consultant and educator in the fields of advanced PC operating platforms and PC technology since 1984. He is a contributing editor for Compute, BYTE, and OS/2 Magazine. You can contact him at CompuServe 71571,264 or Internet mminasi@access.digex.net.

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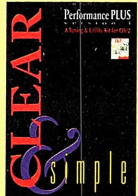
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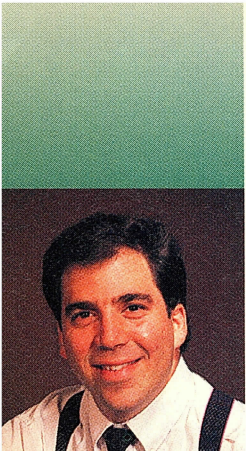
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Blast off with the Launch Pad

MORE RESOURCE MANAGER, REMOVING DRIVE B:, AND MORE... BY DAVID REICH

CLEAN DESK POLICY

The new Launch Pad that was introduced in OS/2 Warp 3.0 gives you a new way to set up your system and manage the way you start programs. Programs can be started from command prompts, program-reference objects on the desktop, or program-reference objects within folders that reside on the desktop. You can start programs (or open any object for that matter) with a single click from the Launch Pad.

You can configure the Launch Pad with drag-and-drop actions on the objects you want, putting them where you want on the Launch Pad. In the December issue (pp.75-79), I discussed putting objects on the Launch Pad or in the drawers. When I first started to use the Launch Pad, I got used to opening up just about everything I needed from it. At first, I kept the original objects that had representations on the Launch Pad underneath it, so I did not take up screen real estate by keeping the object and the Launch Pad on the desktop. Another option does exist, however, if you are willing to adhere to a "clean desk" policy.

First, set up the Launch Pad the way you like it, so you have instances of any object you need to start in the Launch Pad. Have it set up completely. Then, open the Desktop Settings notebook. Go to the Include page by clicking with mouse-button one on the Include tab. You'll see the default Include criterion, which says to include objects where the title is equal to * (which is a wild card), so all objects residing on the desktop are shown. Click on Delete so that no criteria are defined. Now, click on the Add pushbutton. You will see a dialog that allows you to define the new criteria.

The default selection for Attribute is Object Title, and the default selection for Comparison type is "equal to." The default for Comparison value is *, which means that it will include everything. Click on that field and remove the *. Type in some gibberish, for example, "qwerty," which tells it that when the desktop is displayed, only include objects that have an object title that is equal to qwerty. As long as you have no objects with that title, when you click on **add**, all objects on the desktop will disappear. They are not deleted, they are simply invisible. Now, you can control your whole system from the Launch Pad—a clean desk running the whole system from this one tool.

If you ever decide that you don't like this configuration or find that you want to see certain things on your desktop, you can go back to the desktop settings and change your include criteria, or just click on the Default pushbutton, which will delete all added or modified criteria and restore the system-default criteria. I've found that this method is a convenient and useful way to run my desktop.

RESOURCE MANAGER

Q: In last month's column (January 1994, pp. 67-70), you talked about the Resource Manager. Can you explain what it is and tell me more about it?

A: The Resource Manager is code that was introduced in OS/2 Warp 3.0 that assists both you and the system in identifying, keeping track of, and managing the hardware resources in your computer. The Resource Manager is part of the operating system device-driver processing and has associated code in the OS/2 device drivers. When you start your OS/2 system, Resource Manager examines the

hardware devices to determine what is present. It allows many different configurations and assists you in managing the system. The RMVIEW program that was shown in the last issue is the user interface to the Resource Manager. This interface allows you to see what you have and how it is currently configured.

Another part of the Resource Manager that can be configured is the device driver, *reserve.sys*. Like RMVIEW, *reserve.sys* is not included in the OS/2 Warp 3.0 documentation. For that reason, I'll document it as follows.

Reserve.sys is used in conjunction with the Resource Manager in two separate scenarios:

- If you are using a device driver that is not Resource Manager-aware (the OS/2-supplied device drivers are aware, but others, which you may have gotten from sources besides IBM, may not be) and you know the resources (such as memory addresses, DMA, and so on) that the device driver uses, you can use *reserve.sys* to reserve those resources so the Resource Manager-aware device drivers will try to gain access to them.
- If you have a piece of hardware that does not tolerate having its resources examined, you can reserve those resources so that the Resource Manager-aware device drivers do not examine that hardware.

To use *reserve.sys*, use the following statement as your first line in *config.sys*:

```
basedev=reserve.sys <parameters>
```

The parameters are shown in Listing 1.

The formats of these parameters are somewhat complex and are hardware-dependent. Table 1 offers some examples to help you through.

Only one resource attribute (/EXC,

Fragment 1:

```
BASEDEV=RESERVE.SYS /IRQ:13 /DMA:0 /MUL /MEM:CA00,1024 /SHA /IO:340,10 /DW:10
```

/MUL or /SHA) is allowed per resource entry. If no attribute or decode width is set, the default is /EXC with a width of 16. For example, if you want to reserve IRQ 13 Exclusive, DMA 0 multiplexed, memory CA00:0 for 1,024 bytes shared, I/O port 340 for 10 ports exclusive, and decode width 10, you would add the line as shown in Fragment 1 as the first line in *config.sys*.

Hardware settings that are set with jumpers or in CMOS are not changed by the operating system. Some device drivers that are not Resource Manager-aware may need to claim ports, addresses, and so on instead of allowing the Resource Manager-aware drivers to see what is available and go after them. *Reserve.sys* is a part of the Resource Manager that reserves a set of resources for devices or tells the Resource Manager not to probe the device and simply sets aside the resources that it wants to use. It is not

used for remapping, but for reserving resources for devices that don't allow themselves to be probed or that use dri-

vers that are not Resource Manager-aware, yet need specific addresses or other resources.

Listing 1: *Config.sys* parameters.

```
|
|
|_↓_ /IO:
|
|_ /P: _____ |_____ /DW: ____ |_____ /EXC ____ |
|_ /MEM: _____ |_____ /MUL ____ |
|_ /DMA: _____ |_____ /SHA ____ |
|_ /IRQ: _____ |
```

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Table 1: Explanation of *reserve.sys* parameters.

Parameter	Format	Sample	What it does
/IO	/IO:x,y	/IO:340,4	Reserves I/O ports. The first number is the base port address in hex, followed by the number of ports to be reserved, in decimal.
/DW	/DW:x	/DW:10	Decodes the width of the I/O address. The allowable values are 10 and 16. This switch is only valid in conjunction with /IO.
/P			Performs the same function as /IO.
/MEM	/MEM:x,y	/MEM:CA00,1000	Reserves memory addresses. The first number (x) is the base memory address in hex with the assumption of offset 0. The second number (y) is the length of memory to be reserved, in decimal.
/DMA	/DMA:x	/DMA:2	Reserves a DMA channel—x is the DMA channel to be reserved in decimal.
/IRQ	/IRQ:x	/IRQ:13	Reserves an IRQ level—x is the IRQ level to be reserved in decimal.
/EXC	/EXC	/EXC	Indicates an exclusive resource attribute.
/MUL	/MUL	/MUL	Indicates a multiplexed resource attribute.
/SHA	/SHA	/SHA	Indicates a shared resource attribute.

REMOVE DRIVE B:

Q: I have a laptop computer with only one disk drive. Whenever I open my drives folder, I see a disk icon for drive *b:*. Since I don't ever plan to have a *b:* drive in this computer, how can I get rid of the object? When I try to shred it, I get the "you can't drop that here" sign.

A: As you've already noticed, the Drives objects cannot be shredded. Some shareware programs allow you to shred a normally unshreddable object, but an easier method does exist.

My first thought, when I received this question, was to write a REXX program to remove the undeletable attribute from the drive *b:* object and either shred it or call the REXX function to delete the object. However, it occurred to me that the shell is very intelligent and aware of hardware changes in your computer when it initializes itself. For example, if you look at the network awareness of the drives

when you attach to the network, you will notice that the shell knows when new drives have been added. It is obvious that the shell is reconfigured to have a drive *b:*, and it would stand to reason that if the shell saw that no drive *b:* object was present at start up, it would put one there, so the shredding alternative would not be useful. However, an easier alternative that is more flexible than deleting the drive *b:* object does exist.

All folders have an Include setting. This setting tells the folder which objects to include or exclude. To remove your drive *b:* object from the folder, go to the Include setting and tell it to exclude drive *b:*. First, open the Settings notebook for the Drives object folder. To open the Settings notebook, click with the right mouse button on the object and select Settings. (If you are not using OS/2 Warp 3.0, you will need to click on the arrow next to Open and select Settings.) Once the Settings notebook is open, click on the Include tab. You will see a default-system set-

ting to include all non-hidden items. At this point, you can add your own additional include criteria.

First, click on the Add pushbutton. A dialog window will appear to prompt you for the include criteria you wish to set. The default in the criteria is "object title" and "is equal to." Although you can use the drop-down boxes to set many include criteria, these options are exactly the ones you want for this operation. Simply click on the Comparison Value field, remove the asterisk, and type **drive b**. Now, click on "Change" and close the Settings notebook. From now on, when you open your Drives object, you will not see drive *b:*. If you ever do add a *b:* drive, simply remove this extra criterion, and voila! Your Drive *b:* object is back.

FAKING OUT WINDOWS

Q: I have a weakness for using the MMPM Audio CD player while I work. However, I have a Windows program that, when it starts, insists on looking at every available drive. When it looks at the *i:* drive, which is my CD, I get a message that tells me the drive is currently in use and I have to click with the mouse to get it to go away. Can I fake Windows into not looking at the *i:* drive?

A: My first suggestion is that you try to tell the application to stop scanning all of the drives. If you can't do that, only one other option exists. No setting in Windows or Win-OS/2 will tell Windows to ignore a specific drive letter. The only way to work around this problem is to open up the Settings for the program-reference object for the program that scans your drives. Follow the directions as I described previously, bringing up the context menu with mouse-button two, and select Settings. Click with mouse-button one on the Session tab and click on DOS Settings. Choose all Settings to see the DOS settings for that session. Scroll down to select **DOS_LASTDRIVE**.

Click once on **DOS_LASTDRIVE** and you will see the default "z" in the entry field. Click on it. If your CD is drive *i:*, enter the letter H. As a result, that Virtual DOS Machine (VDM) will think it only has drives up through drive *h*.

Tips & Tricks

Of course, if you have any drives (networked or local) that are higher than *h:*, you will not be able to see them, but you won't get that pop up.

This solution can be modified depending on how you start your Windows programs under OS/2. If you start this particular program from a program-reference object in its own seamless window, the directions I have given you will work fine. If, however, you run more than one Windows program under OS/2 seamlessly in the same VDM, you must make this same modification to all of the program-reference objects that run in the same VDM.

If you start your Windows programs under OS/2 from the Program Manager, all you need to do is make the previously-described modification to the program-reference object that you use to start Program Manager. The key is to make sure that the VDM does not report any drive letters that are higher than *h:*.

This solution also depends on how the application finds the devices to query. If it asks the system, this solution will work. If the application tries to

do more direct-hardware access and starts hitting drive letters until it can't find any more, you may not be able to do anything about it.

INITIALIZING SESSIONS

Q: I have a REXX *.cmd* file that I use to initialize my command-prompt sessions. When I open a command prompt (either windowed or full-screen) I simply type in the name of the program and it runs, setting some things up. I can then use the session with these new items. I tried this procedure from a program-reference object, but when I put the name of the program in the program-reference object, the REXX file runs and the session ends. How can I use my REXX file to initialize my sessions?

A: The first thing you need to do is specify the command interpreter as the program you want. You can do so by telling the program-reference object (in the Path and filename field on the

Program page) that the program is *cmd.exe*, or you can specify a * in that field, which indicates the command interpreter. On the Session page, check the appropriate session type—either OS/2 Full Screen or OS/2 Window. The key to making it work is what you enter for the parameters on the Program page.

In the Parameters field on the Program page, enter the path and file name of your *rexx .cmd* file, but precede it with a */k*. The */k* tells it to keep the session open (not just the window). So, for example, if your program is *d:\misc\color.cmd*, specify the setting and, in the parameters field, enter:

```
/k D:\MISC\COLOR.CMD
```

David Reich, a contributing editor to OS/2 Magazine and author of Designing OS/2 Applications, has been with the OS/2 development team since 1987. David is interested in your questions and suggestions. Contact him at CompuServe 76711,632 or Internet speedracer@vnet.ibm.com.

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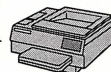
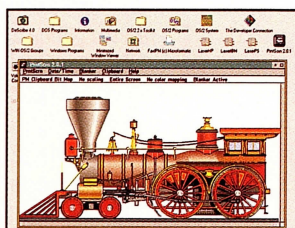
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THREE BOOKS FROM HARKEY, ORFALI, ET AL. BY STAN KELLY-BOOTLE

Can I really do justice to three meaty books that total 2,637 pages in the meager space allowed by the editor? Well, the task is simplified by the fact that we have a common thread of publisher, target domain, and authorship. The books are all from Van Nostrand Reinhold, a publisher whose exemplary commitment to OS/2 merits our support. The topic that they cover is the pandemic known as client/server—a subject that no reader of this magazine can safely ignore.

Why is client/server such a hot, yet fuzzy, subject? Briefly, we have two emerging strands: downsizing and upsizing (often blandly combined as “right-sizing”). Downsizing is the move from central mainframes to possibly cheaper workstations and PCs that “distribute” the data-processing chores. Upsizing is where your stand-alone PCs and PC-based LANs run out of steam, so you start introducing workstation and even mainframe servers! Who does what to whom, when, and where? Aye, there’s the theological rub. As the Kuhnian bumper stickers warn you: “Shifts Happen!”

The three co-authors are uniquely qualified to guide you through the conceptual jungles and technical quicksands of this new client/server paradigm. Robert Orfali and Dan Harkey work for IBM, where they design and build client/server systems for real-world, tax-paying, payroll-making companies. Jeri Edwards is Director of Transaction Processing and Client/Server Software Development at Tandem Computers Inc. Together, the authors have more than 40 years of experience with practical software development in the diverse operating systems, communications protocols, databases, and hardware platforms that messily converge in the world of client/server. What’s equally important is that the authors have evolved an

attractive, unstuffy writing style complemented with helpful diagrams, witty cartoons, and occasional soapboxes containing unabashed, refreshing dogmas (a pleasant change from the usual two-handed wimperies that are found in other books).

The three books, I suggest, offer a progressive guide through the client/server morass. For a gentle, readable introduction, try the *Essential Client/Server Survival Guide*. This volume is a masterly forest-from-the-trees distillation (a mere 527 pages) in which OS/2 is presented as just one of the many players. You’ll emerge with a solid understanding of all the essential three-letter acronyms/abbreviations (TLAs): NOS, SQL, DCE, OLE, RDA, DMI, DME, SNA, and more.

Depending on your needs, you can tackle the 969 pages of the *Client/Server Survival Guide with OS/2*. Naturally, some overlap occurs with the *Essential Client/Server Survival Guide*, but by now you’ll know enough to skip around judiciously. As the title indicates, the authors’ OS/2 bias starts to show. OS/2 is pushed as the ideal OS for both client and server (one soapbox bears the heading, “OK, So We’re OS/2 Bigots!”). In spite of this slant, the overall client/server coverage is wide and breathtaking. Some chapters focus on DSOM and SOMobjects, Distributed System Management (including Internet’s SNMP), and LAN NetView. If you survive to Chapter 43, you’ll get a “Bringing It All Together” summary—20 pages on client/server tools and application development.

The final volume in the trilogy under review is the widely-acclaimed massive *Client/Server Programming with OS/2 2.1*. This third edition weighs in at 1,142 pages. Again, some overlap occurs with the Survival Guides discussed earlier, but the pace is brisker and the content is aimed at the experienced programmer.

The book details the development of several client/server applications with full source-code listings. A 3 1/2-inch disk is available separately for \$34.95.

Each of these books is a gem, written *con spirito* with typography and layout to match. Beginners who are anxious to know what the client/server fuss is all about should start with *Essential Client/Server Survival Guide* before deciding how much deeper to paddle. If you already know the client/server basics, the *Client/Server Survival Guide with OS/2* is an excellent next step. Only the seasoned programmer should go straight into *Client/Server Programming with OS/2 2.1—Third Edition*.

Stan Kelly-Bootle started computing on EDSAC I at Cambridge over 40 years ago and has written at least 11 books. His “Devil’s Advocate” column in UNIX Review has been running since 1984. His new book *The Computer Contradiction* will appear in the MIT Press Spring 1995 catalog. He welcomes e-mail via CompuServe 70323,1560 or Internet skb@crl.com.

RESOURCES:

Essential Client/Server Survival Guide (\$24.95)

by Robert Orfali, Dan Harkey and Jeri Edwards, 1994.
Optional disk (\$34.95)

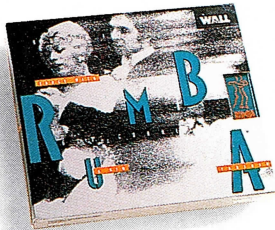
Client/Server Survival Guide with OS/2 (\$39.95)

by Robert Orfali and Dan Harkey
Optional disk (\$34.95)

Client/Server Programming with OS/2 2.1—Third Edition (\$39.95)

by Robert Orfali and Dan Harkey
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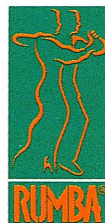
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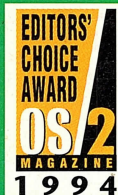
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OS/2 Magazine

Australian News Supplement

February 1995

Apologies!

Firstly, our apologies for the late delivery of the last few issues of OS/2 Magazine. These were unfortunately caused by clerical errors at the printers in the US; however, things are now on a much more organised footing and issues should arrive on a much more timely basis from now on.

Osborne to Bundle Warp

Sydney, 18 January, 1995 ... Osborne Computers and IBM today announced that Osborne, the leading PC manufacturer in Australia, will standardise on an IBM software platform on its whole PC line.

Effective immediately, Osborne will ship IBM PC DOS and OS/2 Warp as the standard PC operating system platform, replacing Microsoft DOS and Windows for Workgroups 3.11.

"We believe our base of corporate customers, government and home users are best served by a platform of IBM PC DOS and OS/2 Warp", said John Linton, CEO of Osborne Computers. "They have demanded a full, pre-emptive, multi-tasking 32-bit operating system with an integrated application set such as the BonusPak shipped with Warp, while those who specifically wish to use Windows can request it from us".

"Osborne has a reputation as the trendsetter among Australian PC companies", said IBM Original Equipment Manufacturer (OEM) Manager Michael Ellenby. "This decision reflects both the acceptance of Warp and IBM software products by the market, and also indicates the direction many PC companies will take to

respond to this demand. Customers no longer need to be locked into a Microsoft standard, and are exercising their right to decide their ideal software. Increasingly that decision is leading them to IBM".

IBM has built its software business over the previous two decades, and now commands a software revenue in excess of its four nearest competitors - Microsoft, Novell, Oracle and Computer Associates - combined.

OS/2 Warp was released in October 1994 and shipped over a million copies worldwide in its first three months of release. The signing of Osborne to preload Warp sees OS/2 more than double its OEM market share,

"We're not going to cripple some very hot hardware with a sh*t operating system" - Osborne MD John Linton on why Osborne won't bundle Windows

and negotiations with other OEMs are expected to be finalised over the next few months.

Osborne Computers was founded in 1982 and in 1994 shipped more desktop computers in Australia than any other manufacturer. Strategies such as the introduction of 5-year on-site warranties and preloading Microsoft Windows and Windows for Workgroups were first pioneered by Osborne and later adopted by the industry at large. Osborne is a fully Australian-owned company, with its PC product line manufactured exclusively in Australia.

The Hard Facts on IBM Software

1. IBM is the world's largest software vendor.
2. In 1993, IBM posted software revenue of approximately US\$11 billion - more than the combined totals of Microsoft, Computer Associates, Oracle, Novell and Lotus.
3. IBM's DB2 family of relational databases is the world's largest selling database with over 350,000 licences sold across all platforms.
4. IBM holds over 150 software patents on DB2 and 80% of the Fortune 500 (including 96 of the top 100) rely on DB2 to manage business related applications.
5. Thanks to the innovative work of its 21,000 software developers, IBM currently holds the world's largest portfolio of software patents.
6. IBM's software portfolio includes the world's most comprehensive family of operating systems, as well as enterprise and desktop applications, databases, network products and groupware.
7. IBM is one of the world's leaders in Object Oriented technology. In application development alone, IBM has released Visual Age, Visual Gen, Smalltalk, COBOL, RPG and PL/I with OO capabilities.
8. Many of IBM's software products run not just on IBM hardware, but also hardware from Hewlett-Packard, Sun, DEC, Fujitsu, Hitachi, Amdahl and industry standard x86 personal computers.

New C++ Class Library

A new class library, developed in Australia by Virtual Software, is claimed to function as a virtual operating system. i++ encapsulates the entire OS/2 Control Program, Presentation Manager and Graphics Programming Interface API's.

The i++ kernel performs class construction and destruction and maintains reference counts, and also makes extensive use of the C++ exception mechanism, providing an exception class hierarchy which encapsulates all OS/2 errors.

Documentation includes a comprehensive Online Programming Reference which is made easier to use through a good basic class structure and consistent naming conventions. This is complemented with over 120 samples.

The i++ Class Library is available on floppy disk or CD-ROM, at \$499.00

Orange NSW 2800. Phone (041) 456 3256. Fax (041) 457 1695. Or Internet virtsoft@ozemail.com.au or 100354.2454@compuserve.com.

New Programming Course

A new programming course from Les Bell and Associates introduces C programmers to the C++ programming language. Specially designed to meet the needs of OS/2 developers, "Introduction to C++ Programming" covers the essential features of the C++ language such as classes, overloading, virtual functions and user-defined types, as well as providing an introduction to object-oriented design and use of the IBM C++ User Interface Class Library.

For further details contact Les Bell and Associates on (02) 953 7619 or IBM Customer Education on (008) 801 088, quoting course code OS292.

IBM Global Network comes to Melbourne

The IBM Global Network (known to many as Advantis) has added a Melbourne number: (03) 690 3300. Melbourne users should add this into the settings notebook of the "IBM Internet Dialer".

Fullpack Will Include LAN Client

IBM has announced that the forthcoming 'Fullpack' or 'blue-spine' version of Warp will

Expect Object REXX to appear on DOS, Windows, Macintosh and AIX, as well as on OS/2 Warp.

include network client support, as well as the WIN-OS/2 subsystem which eliminates the need for an existing copy of DOS and Windows. In addition, this version of Warp will include a bundled copy of Lotus Notes Express.

Microsoft Endorses OpenDoc

Bowing to pressure from developers, Microsoft has removed the requirement for OLE support in products able to be packaged with a Windows 95 compatibility logo. The admission that OpenDoc provides interoperability with OLE will allow software developers to use the superior OpenDoc technology, with its cross-platform support, higher performance and lower development costs, yet still display the Windows 95 logo.

Borland C++ 2.0

Borland International Inc. has released Borland C++ 2.0 for OS/2, set of C and C++ compilers and tools for OS/2 Warp software development. The major new feature of this release is support for OWL, Borland's Object Windows Library, allowing cross-platform migration of

applications previously developed for Windows.

Internet Sites

For those just getting their Internet Connections sorted out, here are a few interesting URL's to use in your Web Explorer:

<http://www.mit.edu:8001/activities/os2/os2world.html>

<http://www.warwick.ac.k/~phueg/os2/>

For the REXX devotees:

<http://rexh.hursley.ibm.com/rexx>

<http://www.watcom.on.ca/vxrex/vxrex.html>

And for those just browsing around for neat images:

<http://www.jsc.nasa.gov/nasa/NASAIInternet.html>

Stick those in your QuickList!

Object REXX

Expect IBM to ship an update to the REXX in OS/2 Warp, some time during the first half of 1995. The new Object REXX adds object-oriented features without breaking existing code, and substantially increases the power and utility of the language. Since Object REXX supports SOM, the language is able to directly manipulate Workplace Shell Objects.

In addition, you can expect Object REXX to appear on DOS, Windows, the Macintosh and AIX, extending the reach of this popular language even further!

To submit news releases, or for OS/2 Magazine subscriptions, contact:
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